

## Plug-In DA&C Cards

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<b>PCI-bus Data Acquisition and Control Cards</b>	
<b>PCI / Universal PCI Multifunction Cards</b>	
PCI-1710/1710L/ 1710HG/1710HGL	100 kS/s, 12-bit, (High-gain), PCI-bus Multifunction Card
PCI-1711/1711L	100 kS/s, 12-bit, 16-ch S.E. Inputs Low-cost Multifunction Card
PCI-1712/1712L	1 MS/s, 12-bit, 16-ch High-speed Multifunction Card
PCI-1716/1716L	250 kS/s, 16-bit, 16-ch High-resolution Multifunction Card
PCI-1718HDU/PCI-1718HGU (New)	12-bit Multifunction DAS Card for PCI Bus
PCI-1741U (New)	16-bit, 200kS/s High-Resolution Multifunction Card
PCI-1747U (New)	250 kS/s 16-bit, 64-ch Analog Inputs Card
<b>PCI / Universal PCI Analog Input Cards</b>	
PCI-1713	100 kS/s, 12-bit, 32-channel Isolated Analog Input Card
PCI-1714/1714UL (New)	30 MS/s Simultaneous 4-ch Analog Input Card
<b>PCI / Universal PCI Analog Output Cards</b>	
PCI-1720/1720U (New)	4-ch Isolated Analog Output Card
PCI-1721	12-bit, 4-ch Advanced Analog Output Card
PCI-1723	12-bit, 8-ch Isolated Analog Output Card
PCI-1724U	14-bit, 32-ch Analog Output Card
PCI-1727U (New)	12-ch D/A Output Card
<b>PCI / Universal PCI Non-Isolated Digital I/O Cards</b>	
PCI-1751/1751U (New)	48-bit Digital I/O and Counter Card
PCI-1753/1753E	96/192-bit Digital I/O Card
PCI-1755	80 MB/s Ultra high-speed 32-ch Digital I/O Card
<b>PCI / Universal PCI Isolated Digital I/O Cards</b>	
PCI-1730	32-ch Isolated Digital I/O Card
PCI-1733	32-ch Isolated Digital Input Card
PCI-1734	32-ch Isolated Digital Output Card
PCI-1752	64-ch Isolated Digital Output Card
PCI-1754	64-ch Isolated Digital Input Card
PCI-1756	64-ch Isolated Digital I/O Card
PCI-1758UDI/ PCI-1758UDO (New)	128-ch Isolated Digital I/O Card
PCI-1757UP	12-bit Multifunction DAS Card for PCI Bus
PCI-1736UP (New)	32-ch Isolated Digital IO Low-profile PCI Card
PCI-1763UP	8-ch Relay and 8-ch IDI Low-profile PCI Card
PCI-1750	32-ch Isolated Digital I/O and Counter Card
PCI-1761	8-ch Relay Actuator and 8-ch Isolated D/I Card
PCI-1760/1760U (New)	8-ch Relay Actuator and Isolated D/I Card
PCI-1762	16-ch Relay Actuator and 16-ch Isolated D/I Card
<b>Counter Cards</b>	
PCI-1780	8-ch Counter/ Timer Card
<b>ISA-Bus Data Acquisition and Control Cards</b>	
<b>Multifunction Cards</b>	
PCL-711B/S	Analog and Digital I/O Card
PCL-812PG	MultiLab Analog and Digital I/O Card
PCL-818 Series	High-performance Multifunction Card
PCL-818L/LS/H	40 kS/s Multifunction Card
PCL-818HD/HG	High-performance Multifunction Card
<b>Analog Input Cards</b>	
PCL-813B	32-ch S.E. Isolated A/D Card
<b>Analog Output Cards</b>	
PCL-726	6-ch D/A Output Card
PCL-727	12-ch D/A Output Card
PCL-728	Isolated 2-ch D/A Output Card
<b>Non-Isolated Digital I/O Cards</b>	
PCL-720+	Digital I/O and Counter Card
PCL-722	144-bit Digital I/O Card
PCL-724	24-bit Digital I/O Card
PCL-731	48-bit Digital I/O Card
<b>Isolated Digital I/O Cards</b>	
PCL-725	Relay Actuator and Isolated D/I Card
PCL-735	12-ch Relay Actuator Card Counter Card
PCL-730	32-ch Isolated Digital I/O Card
PCL-733	32-ch Isolated Digital Input Card
PCL-734	32-ch Isolated Digital Output Card
PCL-836	6-ch Counter/Timer Card
<b>PC/104 I/O Modules</b>	
PCM-3712	12-bit, 2-ch Analog Output Module
PCM-3718H/HG/PCM-3718HO (New)	100 kS/s, 12-bit, 16-ch Multi-function Module
PCM-3724	48-ch Digital I/O Module
PCM-3725	8-ch Isolated Digital Input and 8-ch Relay Output Module
PCM-3730	16-ch Isolated Digital I/O Module
PCM-3780 (New)	2-ch Counter/Timer with 24 ch TTL DIO Module
<b>GPIO interface series</b>	
PCI-1670	GPIO interface PCI card
PCI-1671 (New)	High-Performance IEEE-488.2 Interface for PCI-Bus Computers
<b>Portable Data Acquisition Modules</b>	
USB-4711 (New)	100 kS/s, 12-bit USB Multifunction Module
USB-4716 (New)	100 kS/s, 16-bit USB Multifunction module
USB-4718 (New)	8-ch Thermocouple Input Module
<b>ISA-Compatible PCI Cards</b>	

# Data Acquisition and Control Tutorial

## PC-based Data Acquisition System Overview

In the last few years, industrial PC I/O interface products have become increasingly reliable, accurate and affordable. Because of this, PC-based data acquisition and control systems are now widely used in industrial and laboratory applications such as: monitoring, control, data acquisition and automated testing.

Selecting and building a DA&C (Data Acquisition and Control) system that actually does what you want it to do requires some knowledge of electrical and computer engineering. This tutorial gives a brief introduction to what DA&C systems do and how to configure them. It covers:

- Transducers and actuators
- Signal conditioning
- Data acquisition and control hardware
- Getting Started
- Computer systems software

## Transducers and Actuators

A transducer converts temperature, pressure, level, length, position, etc. into voltage, current, frequency, pulses or other signals.

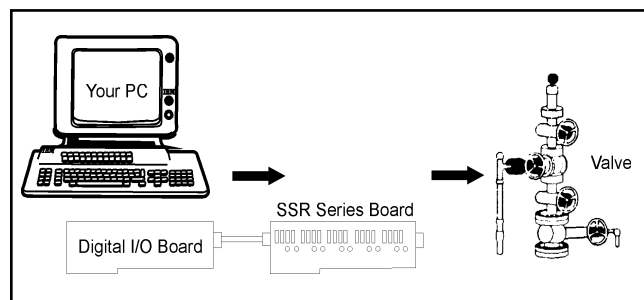
Thermocouples, thermistors and resistance temperature detectors (RTDs) are common transducers for temperature measurements. Other types of transducers include flow sensors, pressure sensors, strain gauges, load cells and LVDTs, which measure flow rate, pressure variances, force or displacement.

An actuator is a device that activates process control equipment by using pneumatic, hydraulic or electrical power. For example, a valve actuator can open and close a valve to control fluid rates.

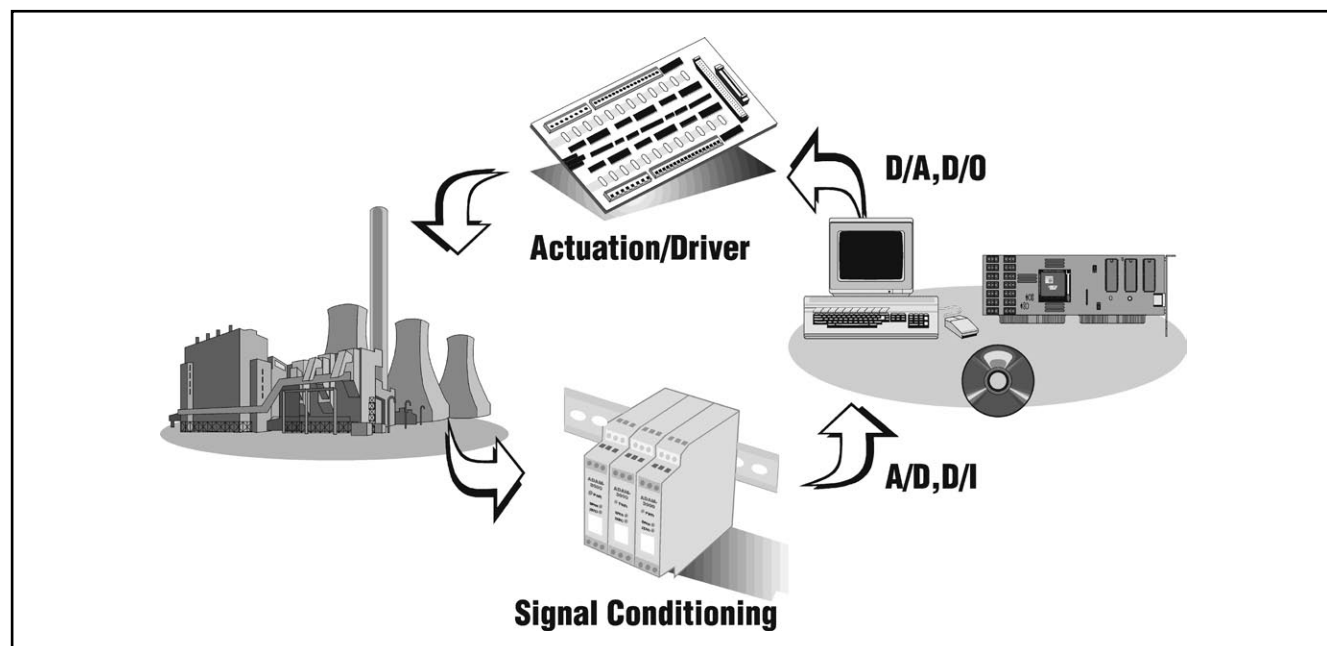
## Signal Conditioning

Signal conditioning circuits improve the quality of signals generated by transducers before they are converted into digital signals by the PC's data-acquisition hardware. Examples of signal conditioning are signal scaling, amplification, linearization, cold-junction compensation, filtering, attenuation, excitation, common-mode rejection, and so on.

One of the most common signal conditioning functions is amplification. For maximum resolution, the voltage range of the input signals should be approximately equal to the maximum input range of the A/D converter. Amplification expands the range of the transducer signals so that they match the input range of the A/D converter. For example, a x10 amplifier maps transducer signals that range from 0 to 1 V into the range 0 to 10 V before they go into the A/D converter.



Using digital I/O and SSRs to open and close a valve



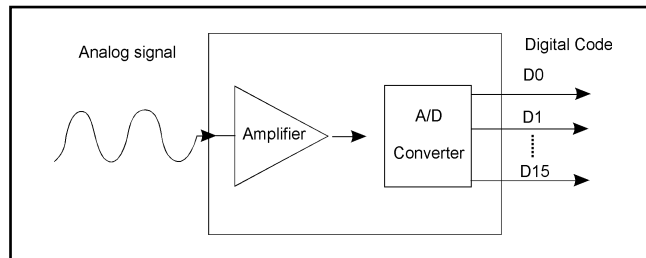
The layout of a typical PC-based data acquisition system

## Data Acquisition & Control Hardware

Data acquisition and control hardware generally performs one or more of the following functions: analog input, analog output, digital input, digital output and counter/timer functions. This section will discuss each function and list some considerations that are important when you select a data acquisition and control system.

### Analog Inputs (A/D)

Analog to digital (A/D) conversion changes analog voltage or current levels into digital information. The conversion is necessary to enable a computer to process or store the signals.

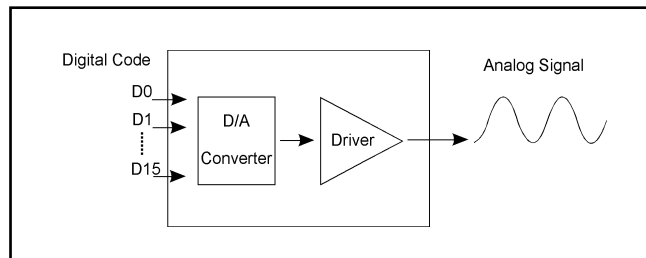


The most significant criteria when selecting A/D hardware are:

1. Number of input channels
2. Single-ended or differential input signals
3. Sampling rate (in samples per second)
4. Resolution (usually measured in bits of resolution)
5. Input range (specified in full-scale volts)
6. Noise and nonlinearity

### Analog Outputs (D/A)

The opposite of analog to digital conversion is digital to analog (D/A) conversion. This operation converts digital information into analog voltage or current. D/A devices allow a computer to control real-world events.



Analog output signals may directly control process equipment. The process can give feedback in the form of analog input signals. This is referred to as a closed loop control system with PID control. Analog outputs can also be used to generate waveforms. In this case, the device behaves as a function generator.

### Digital Inputs and Outputs

Digital input/output functions are useful in applications such as contact closure and switch status monitoring, industrial On/Off control and digital communications.

### Counter/timer

A counter/timer can be used for event counting, flowmeter monitoring, frequency counting, pulse width measurement, time period measurement, and so on.

## Getting Started

### Advantech: The source for what you need

Advantech manufactures data acquisition hardware and software for measurement, monitoring and applications control. The following guide is provided to help you choose components for your data acquisition system.

#### Step 1: Know your fundamental goal

Decide whether your DA&C system will be used primarily for measurement, monitoring, control, or analysis. Know the data requirements of your process, and know the number of data collection points in your system. Know the required data collection speed, the sampling rate, the type of measurement, the voltage or current being produced, the desired accuracy and the output resolution at each data collection point. Finally, know the timing of events in your system, and any special environmental conditions that exist.

#### Step 2: Hardware selection

Select the hardware required to achieve your fundamental goal. Advantech provides plug-in boards for Analog-to-Digital, Digital-to-Analog, Digital I/O, RS-232 or RS-485 needs. Both ISA and PCI bus products are available. Your hardware selection should be based on five major criteria:

1. Number and types of channels
2. Differential or single-ended inputs
3. Resolution
4. Speed
5. Software compatibility with hardware

#### Step 3: Accessory selection

Most applications require additional accessories which are available as separate items. These include:

1. Expansion peripherals to add channels to your system
2. Cables, signal conditioners and external boxes such as screw terminals or BNC accessories

#### Step 4: Software selection

More than any other single factor, software will determine your system start-up time, as well as its effectiveness, suitability for your application, and ease of modification.

Three major criteria should determine the choice of software:

1. Operating system used
2. User programming expertise
3. Software compatibility with hardware

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

# Data Acquisition and Control Cards

Bus			PCI							
Category			Multifunction							
Model			PCI-1710/1710L	PCI-1710HG/HGL	PCI-1711/1711L	PCI1712/1712L	PCI-1716/1716L	PCI-1718HDU/HGU	PCI-1741U	
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	16 bits	
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	
		Onboard FIFO	4K samples	4K samples	1K samples	1K samples	1K samples	4K samples	1K samples	
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s	1 MS/s	250 kS/s	100 kS/s	200 kS/s	
		Auto Channel Scanning	✓	✓	✓	✓	✓	✓	✓	
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25 (PCI-1718HDU) 0~10, 0~1, 0~0.1, 0~0.01 (PCI-1718HGU)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625 (PCI-1718HDU) ±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005 (PCI-1718HGU)	±10, 5, 2.5, 1.25, 0.625	
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	-	
	Trigger Mode	Pacer/Software/External Pulse	✓	✓	✓	✓	✓	✓	✓	
		Analog Slope	-	-	-	✓	-	-	-	
		Pretrigger	-	-	-	✓	-	-	-	
		Post-trigger	-	-	-	✓	-	-	-	
		About-trigger	-	-	-	✓	-	-	-	
	Data Transfer Mode	Software	✓	✓	✓	✓	✓	✓	✓	
		DMA	-	-	-	Bus-mastering	Bus-mastering	-	-	
Analog Output			Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	16 bits
			Number of Channels	2 (PCI-1710 only)	2 (PCI-1710HG only)	2 (PCI-1711 only)	2 (PCI-1712 only)	2 (PCI-1716 only)	1	-
			On-board FIFO	-	-	-	32K samples	-	-	-
			Output Range (V)	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10	-5~5V, -10~10V
			Throughput	38 kS/s Typical**	38 kS/s Typical**	38 kS/s Typical**	1 MS/s	200 kS/s Typical**	100 kS/s Typical**	200 kS/s Typical**
			DMA Transfer	-	-	-	✓	-	-	-
Digital I/O			Input Channels	16	16	16 (mixed)	16	16	16	
			Output Channels	16	16		-	16	16	
Timer/Counter			Channels	1	1	1	3	1	1	1
			Resolution	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit	16-bit
			Time Base	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-	
Auto Calibration			-	-	-	✓	✓	-	✓	
BoardID™ Switch			✓	✓	-	-	✓	✓	✓	
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	
Connector			68-pin SCSI-II	68-pin SCSI-II	68-pin SCSI-II	68-pin SCSI-II	68-pin SCSI-II	DB-37	68-pin SCSI-II	
Windows® 98/2000/XP DLL Driver			✓	✓	✓	✓	✓	✓	✓	
Windows® 98/2000/XP Test Utility			✓	✓	✓	✓	✓	✓	✓	
VC++, VB & Delphi Examples			✓	✓	✓	✓	✓	✓	✓	
Advantech ActiveDAQ			✓	✓	✓	✓	✓	✓	✓	
LabView® I/O Drivers (Ver.6i and 7.0)			✓	✓	✓	✓	✓	✓	✓	
MathWorks MATLAB & Simulink Data Acquisition Tool Box 2.5.1			✓	✓	✓	✓	-	-	-	
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\* Note: SS = *Single* DMA channel, *Single* A/D channel scan    SM = *Single* DMA channel, *Multiple* A/D channel scan    DM = *Dual* DMA channel, *Multiple* A/D channel scan

Selection Guide

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

PCI								ISA		
AI			AO					Multifunction		
PCI-1713	PCI-1714	PCI-1747U	PCI-1720/ 1720U	PCI-1721	PCI-1723	PCI-1724	PCI-1727U	PCL-711B/S	PCL-812PG	PCL-818L/LS
12 bits	12 bits	16 bits	-	-	-	-	-	12 bits	12 bits	12 bits
32 SE/16 Diff. (Isolation)	4 SE	64 SE/32 Diff.	-	-	-	-	-	8 SE	16 SE	16 SE/8 Diff
4K samples	32 K samples	1K samples	-	-	-	-	-	-	-	-
100 kS/s	30 MS/s	250 kS/s	-	-	-	-	-	25 kS/s	30 kS/s	40 kS/s
✓	✓	✓	-	-	-	-	-	-	-	✓
0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-	-	-	-	-	-	-
±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1, 0.5	±10, 5, 2.5, 1.25, 0.625	-	-	-	-	-	±5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625
✓	✓	✓	-	-	-	-	-	✓	✓	✓
✓	✓	✓	-	-	-	-	-	✓	✓	✓
-	✓	-	-	-	-	-	-	-	-	-
-	✓	-	-	-	-	-	-	-	-	-
-	✓	-	-	-	-	-	-	-	-	-
-	✓	-	-	-	-	-	-	-	-	-
✓	✓	✓	-	-	-	-	-	✓	✓	✓
-	Bus-mastering	Bus-mastering	-	-	-	-	-	-	SS*	SM*
-	-	-	12 bits	12 bits	16 bits	14 bits	14 bits	12 bits	12 bits	12 bits
-	-	-	4 (Isolation)	4 (Waveform Output)	8	32	12 -	1	2	1
-	-	-	-	1K samples	-	-	-	-	-	-
-	-	-	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA	-10 ~ 10 0 ~ 20 mA, 4 ~ 20 mA	±10, 0 ~ 20 mA	0-5, 0-10 ±5, 4-20 mA	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10
-	-	-	15 kS/s Typical**	10 MHz max. update rate	15 kS/s Typical**	15 kS/s Typical**	-	30 kS/s Typical**	30 kS/s Typical**	30 kS/s Typical**
-	-	-	-	Bus-mastering	-	-	-	-	-	-
-	-	-	-	16	16	-	16	16	16	16
-	-	-	-	-	-	-	16	16	16	16
-	1	-	-	1	-	-	-	-	1	1
-	8-bit	16-bit	-	16-bit	-	-	-	-	16-bit	16-bit
10 MHz	60 MHz	10 MHz	10 MHz	10 MHz	-	-	-	2 MHz	2 MHz	10 MHz
2,500 V <sub>DC</sub>	-	-	2,500 V <sub>DC</sub>	-	-	-	-	-	-	-
-	✓	✓	-	✓	✓	-	-	-	-	-
-	✓	✓	-	✓	✓	✓	✓	-	-	-
175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	185 x 100	155 x 100
DB-37	4 BNC	68-pin SCSI-II	DB-37	68-pin SCSI-II	68-pin SCSI-II	DB-62	2 x 20-pin, DB-37	2 x 20-pin	2 x 20-pin	DB-37
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	-	-	✓	-	-	-	-	✓	✓	✓
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\*\* Note: System-dependent



# Data Acquisition and Control Cards

Bus			ISA					
Category			Multifunction		AI	AO		
Model			PCL-818HD	PCL-818HG	PCL-813B	PCL-726	PCL-727	PCL-728
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	-	-	-
		Number of Channels	16 SE/8 Diff	16 SE/8 Diff	32 SE	-	-	-
		Onboard FIFO	1K samples	1K samples	-	-	-	-
		Sampling Rate	100 kS/s	100 kS/s	25 kS/s	-	-	-
		Auto Channel Scanning	✓	✓	-	-	-	-
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-	-
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	-	-	-
		Configurable Per-Channel	✓	✓	✓	-	-	-
	Trigger Mode	Pacer/Software/External Pulse	✓	✓	Software only	-	-	-
		Analog Slope	-	-	-	-	-	-
		Pretrigger	-	-	-	-	-	-
		Post-trigger	-	-	-	-	-	-
		About-trigger	-	-	-	-	-	-
	Data Transfer Mode	Software	✓	✓	Software only	-	-	-
		DMA	SM*	SM*	-	-	-	-
Analog Output		Resolution	12 bits	12 bits	-	12 bits	12 bits	12 bits
		Number of Channels	1	1	-	6	12	2 (Isolation)
		On-board FIFO	-	-	-	-	-	-
		Output Range (V)	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	-	0 ~ 5, 0 ~ 10, ±5, ±10, 4 ~ 20 mA	-0 ~ 5, 0 ~ 10, ±5, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
		Throughput	30 kS/s Typical**	30 kS/s Typical**	-	15 kS/s Typical**	15 kS/s Typical**	17 kS/s Typical**
		DMA Transfer	-	-	-	-	-	-
Digital I/O		Input Channels	16	16	-	16	16	-
		Output Channels	16	16	-	16	16	-
Timer/Counter		Number of Channels	1	1	-	-	-	-
		Resolution	16-bit	16-bit	-	-	-	-
		Time Base	10 MHz	10 MHz	-	-	-	-
Isolation Voltage			-	-	500 V <sub>DC</sub> min	-	-	500 V <sub>DC</sub>
Auto Calibration			-	-	-	-	-	-
BoardID™ Switch			-	-	-	-	-	-
Dimensions (mm)			185 x 100	185 x 100	219 x 100	337 x 112	337 x 112	185 x 120
Connector			DB37	DB37	DB37	4 x 20-pin	2 x 20-pin, DB37	2 x DB9
Windows® 95/98/ME/2000/XP DLL Driver			✓	✓	✓	✓	✓	✓
Windows® 95/98/ME/2000/XP Test Utility			✓	✓	✓	✓	✓	✓
VC++, VB & Delphi Examples			✓	✓	✓	✓	✓	✓
Advantech ActiveDAQ			✓	✓	✓	✓	✓	✓
LabView® I/O Drivers (Ver.6i and 7.0)			✓	✓	✓	✓	✓	✓
MathWorks MATLAB & Simulink Data Acquisition Tool Box 2.5.1			✓	✓	✓	✓	✓	✓
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\* Note: SS = Single DMA channel, Single A/D channel scan    SM = Single DMA channel, Multiple A/D channel scan    DM = Dual DMA channel, Multiple A/D channel scan

Selection Guide

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

9  
Motion Control

10  
ICOM

11  
eConnectivity

12  
UNO

13  
ADAM-4000

14  
ADAM-5000

15  
ADAM-6000

16  
ADAM-8000

17  
BAS

Bus			PCI						
Category			Non-Isolated DI/O			Isolated DI/O			
Model			PCI-1751/1751U	PCI-1753/1753E	PCI-1755	PCI-1730	PCI-1733	PCI-1734	PCI-1752
TTL DI/O	Input Channels		48	96	32	16	-	-	-
	Output Channels					16	-	-	-
	Output Channel	Sink Current	24 mA @ 0.4 V	24 mA @ 0.44 V	48 mA @ 0.5 V	8 mA @ 0.5 V	-	-	-
		Source Current	15 mA @ 2.4 V	24 mA @ 3.76 V	15 mA @ 2.4 V	0.4 mA @ 2.4 V	-	-	-
Isolated DI/O	Input Channels	Number of Channels (Input type)	-	-	-	16 (Sink)	32 (Sink)	-	-
		Isolation Voltage	-	-	-	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	-	-
		Input Range	-	-	-	5 ~ 30 V <sub>DC</sub>	5 ~ 30 V <sub>DC</sub>	-	-
	Output Channels	Number of Channels (Output Type)	-	-	-	16 (Sink)	-	32 (Sink)	64 (Sink)
		Isolation Voltage	-	-	-	2,500 V <sub>DC</sub>	-	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>
		Output Range	-	-	-	5 ~ 40 V <sub>DC</sub>	-	5 ~ 40 V <sub>DC</sub>	5 ~ 40 V <sub>DC</sub>
		Max. Sink Current	-	-	-	200 mA	-	200 mA	200 mA
Timer/Counter		Number of Channels	3	-	3	-	-	-	-
		Resolution	16-bit	-	16-bit	-	-	-	-
		Time Base	5 MHz	-	10 MHz	-	-	-	-
Advanced Functions	Pattern Match		-	✓	✓	-	-	-	-
	Change of State		-	✓	✓	-	-	-	-
	BoardID™ Switch		-	-	✓	✓	-	✓	✓
	Channel-Freeze Function		-	-	✓	✓	-	✓	✓
	Output Status Read Back		✓	✓	-	✓	-	✓	✓
	Dry/Wet Contact		✓	✓	-	✓*	✓*	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connectors			68-pin SCSI-II	100-pin SCSI-II	100-pin SCSI-II	1 x DB37 4 x 20-pin	1 x DB37	1 x DB37	100-pin SCSI-II
Windows® 95/98/ME/2000/XP DLL Driver			✓	✓	✓	✓	✓	✓	✓
Windows® 95/98/ME/2000/XP Test Utility			✓	✓	✓	✓	✓	✓	✓
VC++, VB & Delphi Examples			✓	✓	✓	✓	✓	✓	✓
Advantech ActiveDAQ			✓	✓	-	✓	✓	✓	✓
LabView® I/O Drivers (Ver.6i and 7.0)			✓	✓	✓	✓	✓	✓	✓
MathWorks MATLAB & Simulink Data Acquisition Tool Box 2.5.1			✓	✓	-	✓	✓	✓	✓
Page			6-31	6-32	6-33	6-34	6-34	6-34	6-36

\* Dry/wet contact can be mixed at the same time within one group.

# Data Acquisition and Control Cards

Bus		PCI							
Category		Isolated DI/O							
Model		PCI-1754	PCI-1756	PCI-1758UDI	PCI-1758UDU	PCI-1760U	PCI-1761	PCI-1762	PCI-1750
TTL DI/O	Input Channels	-	-	-	-	-	-	-	-
	Output Channels	-	-	-	-	-	-	-	-
	Output Channels	Sink Current	-	-	-	-	-	-	-
		Source Current	-	-	-	-	-	-	-
Isolated DI/O	Input Channels	Number of Channels (Input type)	64 (Sink)	32 (Sink)	128	-	8 (Sink)	8 (Sink)	16 (Sink)
		Isolation Voltage	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	2500 V <sub>RMS</sub>	-	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>
		Input Range	10 ~ 50 V <sub>DC</sub>	10 ~ 50 V <sub>DC</sub>	5 ~ 25 V <sub>DC</sub>	-	5 ~ 12 V <sub>DC</sub>	10 ~ 50 V <sub>DC</sub>	5 ~ 50 V <sub>DC</sub>
	Output Channels	Number of Channels (Output Type)	-	32 (Sink)	-	128	8 X Form C	4 X Form A 4 X Form C	16 X Form C
		Isolation Voltage	-	2,500 V <sub>DC</sub>	-	2500 V <sub>RMS</sub>	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>
		Output Range	-	5 ~ 40 V <sub>DC</sub>	-	5 ~ 40 V <sub>DC</sub>	120 V <sub>AC</sub> @ 0.5 A 30 V <sub>DC</sub> @ 1 A	250 V <sub>AC</sub> @ 3 A 24 V <sub>DC</sub> @ 3 A	120 V <sub>AC</sub> @ 0.5 A 30 V <sub>DC</sub> @ 1 A
		Max. Sink Current	-	200 mA	-	90 mA	-	-	5 ~ 40 V <sub>DC</sub> 200 mA
Timer/Counter	Number of Channels		-	-	-	-	Up CTR for DI 2 X PWM	-	1
	Resolution		-	-	-	-	16-bit (2,500 Isolation)	-	16-bit
	Time Base		-	-	-	-	500 Hz for Up CTR	-	1 MHz
Advanced Functions	Pattern Match		-	-	-	-	✓	-	-
	Change of State		-	-	-	-	✓	-	-
	BoardID™ Switch		✓	✓	✓	✓	✓	✓	-
	Channel-Freeze Function		✓	✓	-	-	-	✓	-
	Output Status Read Back		-	✓	-	✓	✓	✓	-
	Dry/Wet Contact		-	-	✓	✓	✓	-	-
Dimensions (mm)		175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connectors		100-pin SCSI-II	100-pin SCSI-II	dual 100-pin mini-SCSI	dual 100-pin mini-SCSI	1 X DB37	1 X DB37	1 X DB62	1 X DB37
Windows® 95/98/ME/2000/XP DLL Driver		✓	✓	✓	✓	✓	✓	✓	✓
Windows® 95/98/ME/2000/XP Test Utility		✓	✓	✓	✓	✓	✓	✓	✓
VC++, VB & Delphi Examples		✓	✓	✓	✓	✓	✓	✓	✓
Advantech ActiveDAQ		✓	✓	✓	✓	✓	✓	✓	✓
LabView® I/O Drivers (Ver.6i and 7.0)		✓	✓	✓	✓	✓	✓	✓	✓
MathWorks MATLAB & Simulink Data Acquisition Tool Box 2.5.1		✓	✓	-	✓	✓	✓	✓	✓
Page		6-36	6-36	6-38	6-38	6-45	6-44	6-46	6-43

\* Dry/wet contact can be mixed at the same time within one group.



Selection Guide

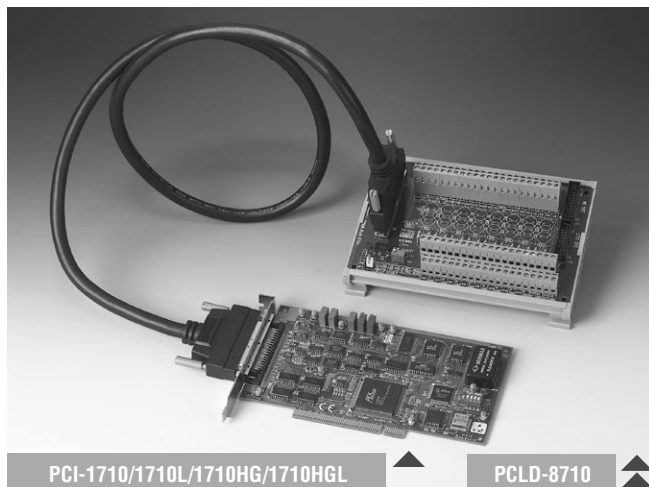
1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

ISA									PCI	ISA
Non-Isolated DI/O				Isolated DI/O					Counter	
PCL-720+	PCL-722	PCL-724	PCL-731	PCL-725	PCL-730	PCL-733	PCL-734	PCL-735	PCI-1780	PCL-836
32	144	24	48	-	16	-	-	-	8	16
32				-	16	-	-	-	8	16
24 mA @ 0.5 V	24 mA @ 0.5 V	24 mA @ 0.4 V	24 mA @ 0.4 V	-	8 mA @ 0.5 V	-	-	-	24 mA @ 0.5 V	8 mA @ 0.5 V
3 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	-	0.4 mA @ 2.4 V	-	-	-	15 mA @ 2.4 V	0.4 mA @ 2.4 V
-	-	-	-	8 (Sink)	16 (Sink)	32 (Sink)	-	-	-	-
-	-	-	-	1,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	2,500 V <sub>DC</sub>	-	-	-	-
-	-	-	-	5 ~ 24 V <sub>DC</sub>	5 ~ 24 V <sub>DC</sub>	5 ~ 24 V <sub>DC</sub>	-	-	-	-
-	-	-	-	4 X Form A 4 X Form C	16 (Sink)	-	32 (Sink)	12 X Form C	-	-
-	-	-	-	1,000 V <sub>DC</sub>	1,000 V <sub>DC</sub>	-	1,000 V <sub>DC</sub>	1,000 V <sub>DC</sub>	-	-
-	-	-	-	120 V <sub>AC</sub> @ 0.5 A 30 V <sub>DC</sub> @ 1 A	5 ~ 40 V <sub>DC</sub>	-	5 ~ 40 V <sub>DC</sub>	0.6 A @ 100 V <sub>DC</sub> 0.6 A @ 125 V <sub>DC</sub>	-	-
-	-	-	-		200 mA	-	200 mA			-
3	-	-	-	-	-	-	-	-	8 X CTR	6 X CTR 3 X PWM
16-bit	-	-	-	-	-	-	-	-	16-bit	16-bit
1 MHz	-	-	-	-	-	-	-	-	20 MHz	10 MHz
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	✓	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
185 x 100	334 x 100	125 x 100	185 x 100	147 x 95	185 x 100	185 x 100	185 x 100	155 x 100	175 x 100	185 x 100
5 X 20-pin	6 x 50-pin	1 x 50-pin 2 x 20-pin	2 x 50-pin	1 x DB37	1 x DB37 4 x 20-pin	1 x DB37	1 x DB37	1 x DB37	68-pin SCSI-II	1 x DB37 2 x 20-pin
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓
6-55	6-56	6-56	6-56	6-59	6-57	6-57	6-57	6-59	6-47	6-60

# PCI-1710 PCI-1710HG

**100 kS/s, 12-bit, PCI-bus  
Multifunction Card**

**100 kS/s, 12-bit, (High-gain),  
PCI-bus Multifunction Card**



PCI-1710/1710L/1710HG/1710HGL

PCLD-8710



## Features

- 16 single-ended, 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain for each input channel
- Free combination of single-ended and differential inputs
- On-board 4 K samples FIFO buffer
- Two 12-bit analog output channels
- 16 digital inputs and 16 digital outputs
- Programmable pacer/counter
- BoardID™ Switch
- Short circuit protection

## Introduction

The PCI-1710 Series are multifunction cards for the PCI bus. Their advanced circuit design provides higher quality and more functions, including the five most desired measurement and control functions: 12-bit A/D conversion, D/A conversion, digital input, digital output, and counter/timer.

## Specifications

### Analog Input

- Channels** 16 single-ended or 8 differential (software programmable)
- Resolution** 12-bit
- On-board FIFO** 4 K samples
- Maximum Input Overvoltage**  $\pm 30$  V
- Input Range** (V, software programmable)

Model	PCL-1710/1710L	PCI-1710HG/1710HGL
<b>Bipolar</b>	$\pm 10, \pm 5, \pm 2.5, \pm 1.25, \pm 0.625$	$\pm 10, \pm 5, \pm 1, \pm 0.5, \pm 0.1 \pm 0.05, \pm 0.01, \pm 0.005$
<b>Unipolar</b>	$0 \sim 10, 0 \sim 5, 0 \sim 2.5, 0 \sim 1.25$	$0 \sim 10, 0 \sim 1, 0 \sim 0.1, 0 \sim 0.01$

### Common Mode Rejection Ratio (CMRR)

PCI-1710/1710L		PCI-1710HG/1710HGL	
Gain	CMRR	Gain	CMRR
0.5, 1	75 dB	0.5, 1	75 dB
2	80 dB	10	90 dB
4	84 dB	100	106 dB
8	84 dB	1000	106 dB

### Maximum Sampling Rate (S/s, depending on PGIA settling time)

Model	Gain	Max. Sampling Rate
PCI-1710/1710L	0.5, 1, 2, 4, 8	100 kS/s
	0.5, 1	100 kS/s
PCI-1710HG/1710HGL	5, 10	35 kS/s
	20, 100	7 kS/s
	500, 1000	770 S/s

**Note:** The sampling rate depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and so on.

### Accuracy (depends on gain)

\* **S.E.:** Single-ended **D:** Differential

PCI-1710/1710L		PCI-1710HG/1710HGL		
Gain	Accuracy	Gain	Accuracy	Remar.k
0.5, 1	0.01% of FSR $\pm 1$ LSB	0.5, 1	0.01% of FSR $\pm 1$ LSB	S.E./D
2	0.02% of FSR $\pm 1$ LSB	5, 10	0.02% of FSR $\pm 1$ LSB	S.E./D
4	0.02% of FSR $\pm 1$ LSB	50, 100	0.04% of FSR $\pm 1$ LSB	D
8	0.04% of FSR $\pm 1$ LSB	500, 1000	0.08% of FSR $\pm 1$ LSB	D

- Linearity Error**  $\pm 1$  LSB
- Input Impedance** 1 G $\Omega$
- Trigger Mode** Software, onboard programmable pacer or external

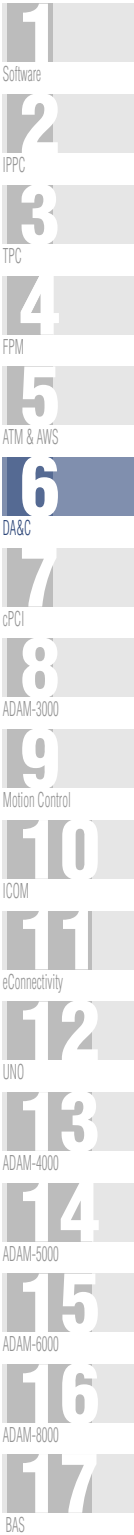
### Analog Output (PCI-1710/1710HG only)

- Channels** 2
- Resolution** 12-bit
- Relative Accuracy**  $\pm 1/2$  LSB
- Gain Error**  $\pm 1$  LSB
- Throughput** PC dependent, Software update (direct AO)
- Slow Rate** 10 V/ms
- Output Range** Internal reference:  $0 \sim +5$  V @  $-5$  V,  
(software programmable)  $0 \sim +10$  V @  $-10$  V  
External reference:  $0 \sim +x$  V @  $-x$  V ( $-10 \leq x \leq 10$ )
- Driving Capability** 10 mA

### Digital Input

- Channels** 16
- Input Voltage** Low: 0.4 V max.  
High: 2.4 V min.
- Input Load** Low: -0.2 mA @ 0.4 V  
High: 20 mA @ 2.7 V

PCI-1710  
PCI-1710HG



Specifications Cont.

Digital Output

- Channels 16
- Output Voltage Low: 0.4 V max. @ 8.0 mA (sink)  
High: 2.4 V min. @ -0.4 mA (source)

Programmable Timer/Counter

- Counter Chip 82C54 or equivalent
- Counters 3 channels, 16 bits, 2 channels are permanently configured as a 32-bit programmable pacer; 1 channel is free for user applications
- Input, gate TTL/CMOS compatible
- Time Base Channel 1: 10 MHz  
Channel 2: Takes input from output of channel 1  
Channel 0: Internal 1 MHz or external clock (10 MHz max.) selected by software.

General

- CE Certified to CISPR 22 class B
- I/O Connector 68-pin SCSI-II female connector
- Power Consumption +5 V @ 850 mA (Typical),  
+5 V @ 1.0 A (Max.)
- Operating Temperature 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- Storage Temperature -20 ~ 70° C (-4 ~ 158° F)
- Operating Humidity 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Dimensions (L x H) 175 x 100 mm (6.9" x 3.9")
- MTBF Over 64,770 hrs @ 25° C, grounded-fix environment

Ordering Information

- PCI-1710 100 kS/s, 12-bit Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- PCI-1710L 100 kS/s, 12-bit Multifunction Card w/o AO, user's manual and driver CD-ROM. (cable not included)
- PCI-1710HG 100 kS/s, 12-bit High-Gain Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- PCI-1710HGL 100 kS/s, 12-bit High-Gain Multifunction Card w/o AO, user's manual and driver CD-ROM. (cable not included)
- PCLD-8710 Industrial Wiring Terminal Board with CJC circuit for DIN-rail mounting (cable not included)
- PCL-10168 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 m.
- PCL-10168-2 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 2 m.
- ADAM-3968 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

Feature Details

PCI-1710 series provide specific functions for different user requirements:

PCI-1710	100 kS/s, 12-bit Multifunction Card
PCI-1710L	100 kS/s, 12-bit Multifunction Card w/o AO
PCI-1710HG	100 kS/s, 12-bit High-Gain Multifunction Card
PCI-1710HGL	100 kS/s, 12-bit High-Gain Multifunction Card w/o AO

Mixed Single-ended or Differential Analog Inputs

PCI-1710 and PCI-1710HG feature an automatic channel/gain scanning circuit. The circuit, rather than your software, controls multiplexer switching during sampling. The on-board SRAM stores different gain values and configurations for each channel. This design lets you perform multi-channel high-speed sampling (up to 100 KHz) with different gains for each channel and allows free combination of single-ended and differential inputs.

On-board FIFO (First In First Out) Memory

PCI-1710, PCI-1710L, PCI-1710HG and PCI-1710HGL have an on-board FIFO buffer that can store up to 4 K A/D samples. PCI-1710 and PCI-1710HG generate an interrupt when the FIFO is half full. This feature provides continuous high-speed data transfer and more predictable performance on Windows systems.

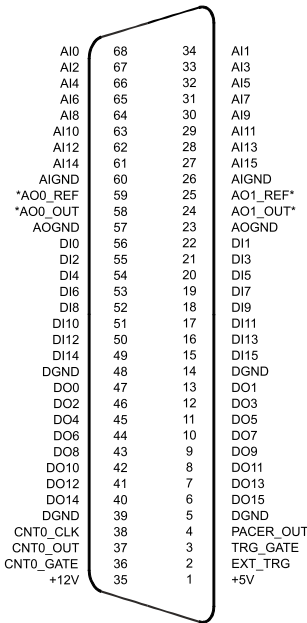
On-board Programmable Counter

The PCI-1710/1710/1710HG/1710HGL provides a programmable counter to generate a pacer trigger for the A/D conversion. The counter chip is an 82C54 or equivalent, which includes three 16-bit counters on a 10 MHz clock. One counter is used as an event counter for counting events coming from the input channels. The other two are cascaded together to make a 32-bit timer for a pacer trigger.

Special Shielded Cable for Noise Reduction

The PCL-10168 shielded cable is specially designed for the PCI-1710/1710HG to reduce noise in the analog signal lines. Its wires are all twisted pairs, and the analog lines and digital lines are separately shielded, providing minimal cross talk between signals and great protection against EMI/EMC problems.

Pin Assignments



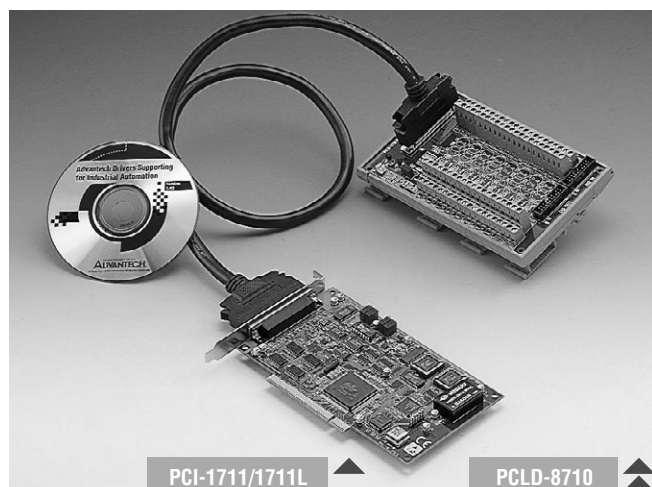
\*: Pins 23~25 and pins 57~59 are not defined for PCI-1710L/1710HGL

# PCI-1711

# PCI-1711L

**100 kS/s, 12-bit, 16-ch S.E. Inputs Low-cost Multifunction Card**

**100 kS/s, 12-bit, 16-ch S.E. Inputs Low-cost Multifunction Card w/o AO**



PCI-1711/1711L

PCLD-8710



## Features

- 16 single-ended analog inputs
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain for each input channel
- Automatic channel/gain scanning
- On-board 1K samples FIFO buffer
- Two 12-bit analog output channels (Only for PCI-1711)
- 16 digital inputs and 16 digital outputs
- Programmable pacer/counter

## Introduction

PCI-1711 and PCI-1711L are powerful, but low-cost multifunction cards for the PCI bus. PCI-1711 comes with 2 analog output channels, while the PCI-1711L doesn't. Thus, PCI-1711L represents a cost saver for those that do not need analog output.

## Specifications

### Analog Input

- Channels** 16 Single-Ended
- Resolution** 12-bit
- FIFO Size** 1K samples
- Sampling Rate\*** 100 kS/s max.

Input range and Gain List	Gain	1	2	4	8	16
		$\pm 10\text{ V}$	$\pm 5\text{ V}$	$\pm 2.5\text{ V}$	$\pm 1.25\text{ V}$	$\pm 0.625\text{ V}$
Drift (ppm/°C)	Gain	1	2	4	8	16
	Zero	15	15	15	15	15
Small Signal Bandwidth for PGA	Gain	25	25	25	30	40
	Bandwidth	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz	0.35 MHz

- Max. Input Overvoltage** 20 V
- Input Protect** 30 Vp-p
- Input Impedance** 2 M $\Omega$ /5 pF
- Trigger Mode** Software, On-board Programmable Pacer or external

Accuracy	DC	INLE: $\pm 0.5\text{ LSB}$
		Monotonicity: 12 bits
		Offset error: Adjustable to zero
	AC	Gain error: 0.005% FSR (Gain=1)
		SNR: 68 dB
		ENOB: 11 bits

### Programmable Counter / Timer

- Channels** 1
- Resolution** 16-bit
- Compatibility** TTL level
- Base Clock** 10 MHz
- Max. Input Frequency** 10 MHz

### Note:

The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and so on.

### Analog Output (only for PCI-1711)

- Channels** 2
- Resolution** 12-bit

Output Range (Internal & External Reference)	Internal Reference	0 ~ +5 V, 0 ~ +10 V
	External Reference	0 ~ +x V @ -x V ( $-10 \leq x \leq 10$ )
Accuracy	Relative	$\pm 1/2\text{ LSB}$
	Differential Non-linearity	$\pm 1/2\text{ LSB}$

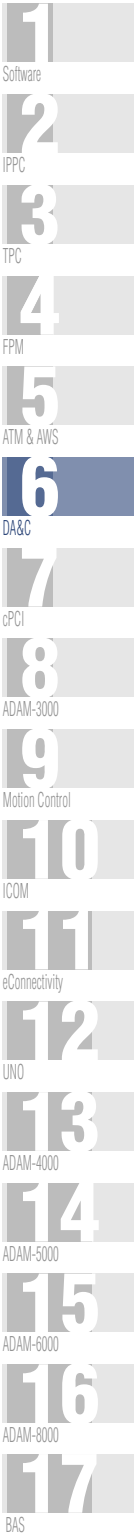
- Gain Error** Adjustable to zero
- Slew Rate** 11 V/ $\mu$ s
- Drift** 40 ppm/°C
- Driving Capability** 3 mA
- Throughput** PC dependent, Software update (direct AO)
- Output Impedance** 0.81  $\Omega$
- Settling Time** 26  $\mu$ s (to  $\pm 1/2\text{ LSB}$  of FSR)
- Reference Voltage** Internal -5 or -10 V  
External -10 or +10 V

### Digital Input / Output

Input Channels	16	
Input Voltage	Low	0.8 V max.
	High	2.0 V max.
Output Channels	16	
Output Voltage	Low	0.8 V max. @ 8.0 mA (sink)
	High	2.0 V min. @ -0.4 mA (source)

### General

I/O Connector Type	68-pin SCSI-II female		
Dimensions	175 x 100 mm (6.9" x 3.9")		
Power Consumption	Typical	PCI-1711	PCI-1711L
		+5 V @ 850 mA	+5 V @ 700 mA
	Max.	+5 V @ 1.0 A	
Temperature	Operation	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)	
	Storage	-20 ~ 70° C (-4 ~ 158° F)	
Relative Humidity	5 % ~ 95 % RH non-condensing (refer to IEC 68-2-3)		



Ordering Information

- **PCI-1711** 100 kS/s, 12-bit, 16-ch S.E. inputs Low-cost Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1711L** 100 kS/s, 12-bit, 16-ch S.E. inputs Low-cost Multifunction Card w/o analog output, user's manual and driver CD-ROM. (cable not included)
- **PCLD-8710** Industrial Wiring Terminal Board with CJC circuit for DIN-rail mounting (cable not included)
- **PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- **ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

Pin Assignments

AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
*AO0_REF	59	25	AOI_REF*
*AO0_OUT	58	24	AOI_OUT*
*AOGND	57	23	AOGND*
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0 CLK	38	4	PACER OUT
CNT0 OUT	37	3	TRG GATE
CNT0 GATE	36	2	EXT TRG
+12V	35	1	+5V

\*: Pins 23~25 and pins 57~59 are not defined for PCI-1711L

Feature Details

Plug & Play Function

PCI-1711 and PCI-1711L fully comply with the PCI Specification Rev 2.1. and thus are Plug & Play devices. During card installation, it is virtually unnecessary to set any jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupts are conveniently taken care of by the Plug & Play function.

Flexible Input Types and Range Settings

PCI-1711 and PCI-1711L feature an automatic channel/gain scanning circuit. This circuit design controls multiplexer switching during sampling. You can set different gain values for each channel according to your needs for the corresponding range of input voltages. The gain values thus selected are stored in the SRAM. This flexible design enables multi-channel and high-speed sampling for high-performance data acquisition (up to 100 kS/s).

On-board FIFO Memory

PCI-1711 and PCI-1711L provide an onboard FIFO (First In First Out) memory buffer, storing up to 1 K A/D samplings. You can either enable or disable the interrupt request feature of the FIFO buffer. While the interrupt request for FIFO is enabled, you can further specify whether the interrupt request will be sent whenever one sampling takes place or when the FIFO buffer is half saturated. This feature enables a continuous high-speed data transfer with more predictable performance on Windows systems.

Onboard Programmable Counter

PCI-1711 and PCI-1711L are equipped with a programmable counter, which can serve as a pacer trigger for A/D conversions. The counter chip is an 82C54 or equivalent, which incorporates three 16-bit counters on a 10 MHz clock. One of the three counters is used as an event counter for input channels. The other two are cascaded into a 32-bit timer for pacer triggering.

Applications

- Process monitoring and control
- Transducer and sensor measurement
- Multi-channel DC voltage measurement

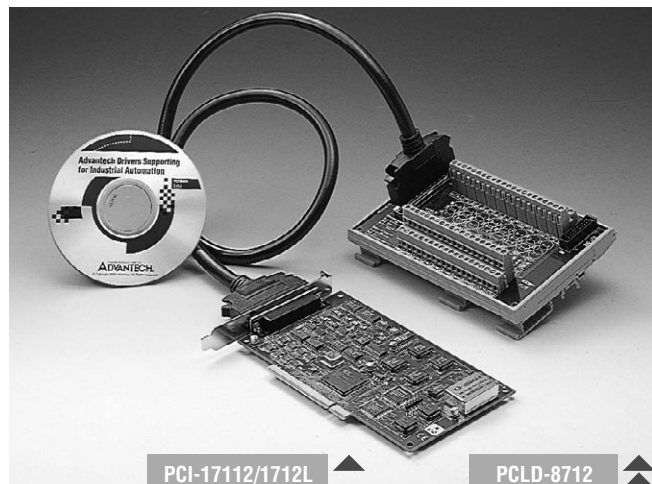


# PCI-1712

# PCI-1712L

## 1MS/s, 12-bit High-speed Multifunction Card

## 1MS/s, 12-bit High-speed Multifunction Card w/o AO function



### Features

- PCI-bus mastering for data transfer
- 16 single-ended, 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 1 MHz sampling rate
- Pre-, post-, about- and delay-trigger data acquisition modes for analog input channels
- Programmable gain for each analog input channel
- Automatic channel/SD\*/BU\* scanning
- On-board FIFO buffer storing up to 1K samples for A/D and 32K samples for D/A
- Two 12-bit analog output channels with continuous waveform output function
- Auto calibration of analog input and output channels
- 16 digital input and output channels
- Three 16-bit programmable multifunction counter/timers on 10 MHz

### Introduction

The PCI-1712/1712L is a powerful high-speed multifunction card for the PCI bus. It features a 1 MHz 12-bit A/D converter, an onboard FIFO buffer (storing up to 1 K samples for A/D, and up to 32 K samples for D/A conversion). The PCI-1712 provides a total of up to 16 single-ended or 8 differential A/D input channels or a mixed combination, two 12-bit D/A output channels, 16 digital input/output channels, and three 10MHz 16-bit multifunction counter channels. PCI-1712/1712L provides specific functions for different user requirements:

### Specifications

#### Analog Input

Channels	16 Single-Ended or 8 Differential or Combination						
Resolution	12-bit		FIFO Size		1 K samples		
Max. Sampling Rate	Multi-channel, single gain: 1 MS/s Multi-channel, multi gain: 600 kS/s Multi-channel, multi gain, unipolar/bipolar: 400 kS/s						
Common Mode voltage	±11 V max. (operational)						
Input Range and Gain List	Gain	0.5	1	2	4	8	
	Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25	
	Bipolar	±10	±5	±2.5	±1.25	±0.625	
Drift	Gain	0.5	1	2	4	8	
	Zero (µV/° C)	±80	±30	±30	±30	±30	
	Gain (ppm/° C)	±30	±30	±30	±30	±30	
Small Signal Bandwidth for PGA	Gain	0.5	1	2	4	8	
	Bandwidth	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz	
Max. Input Voltage	±20 V		Input Protect		30 Vp-p		
Input Impedance	100Ω 10pF (Off); 100Ω 100pF (On)						
Trigger Mode	Software, On-board Programmable Pacer or External, Pre-trigger, Post-trigger, Delay-trigger, About-trigger						
Accuracy	DC	DNLE: ±1LSB; INLE: ±1LSB; Offset error < 1LSB					
		Gain	0.5	1	2	4	8
		Gain Error: (% FSR)	0.15	0.03	0.03	0.05	0.1
	AC	SNR: 68 dB; ENOB: 11 bits; THD: -75 dB typical					

#### Digital Input /Output

Input Channels	16		Number of ports	2 (8-ch/port)
Input Voltage	Low	0.8 V max.	High	2.0V min.
	Low	0.5 V max. @ +24 mA (sink)	High	2.4 V min. @ -15 mA (source)

Note: The sampling rate depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and more.

#### Analog Output

Channels	2		
Resolution	12-bit	FIFO Size	32 K samples
Operation Mode	Single output, continuous output, waveform output		
Output Range (Internal & External Reference)	Using Internal Reference	0 ~ +5 V, 0 ~ +10 V, -5 ~ +5 V, -10 ~ +10 V	
	Using External Reference	0 ~ +x V @ +x V (-10 $\leq$ x $\leq$ 10) -x ~ +x V @ +x V (-10 $\leq$ x $\leq$ 10)	
Accuracy	Relative	$\pm 1$ LSB	
	Differential Non-linearity	$\pm 1$ LSB (monotonic)	
Offset	<1 LSB	Slew Rate	20 V/ $\mu$ s
Drift	10 ppm/ $^{\circ}$ C	Driving Capability	$\pm 10$ mA
Max. Transfer Rate	Single Channel: 1 MS/s max. for FSR Dual Channel: 500 kS/s max. for FSR		
Output Impedance	0.1 $\Omega$ max.	Max. Digital Update Rate	5 MHz
Settling Time	2 $\mu$ s (to $\pm 1/2$ LSB of FSB)		

#### Counter/Timer

Channels		3	Resolution	16-bit
Compatibility	TTL level	Max. Input Frequency		10 MHz
BASE Clock	10 MHz, 1 MHz, 100 KHz, 10 KHz			
Clock Input	Low	0.8 V max.	High	2.0 V min.
Gate Input	Low	0.8 V max.	High	2.0 V min.
Counter	Low	0.5 V max. @ +24 mA	High	2.0 V min. @ -15 mA

#### General

I/O Connector Type	68-pin SCSI-II female		
Dimensions	175 x 100 mm (6.9" x 3.9")		
Power Consumption	Typical	+5 V @ 850 mA; +12 V @ 600 mA	
	Max.	+5 V @ 1 A; +12 V @ 700 mA	
Temperature	Operating	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)	
	Storage	-20 ~ 85° C (-4 ~ 185° F)	
Relative Humidity	5 ~ 95 % RH non-condensing (refer to IEC 68-2-3)		
Certification	CE certified		



# PCI-1712

# PCI-1712L

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

## Ordering Information

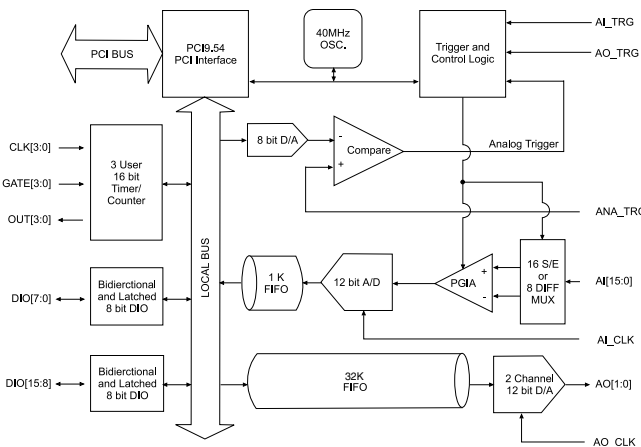
- **PCI-1712** 1MS/s, 12-bit High-speed Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1712L** 1MS/s, 12-bit High-speed Multifunction Card w/o AO, user's manual and driver CD-ROM. (cable not included)
- **PCLD-8712** Industrial Wiring Terminal Board for DIN-rail mounting. (cable not included)
- **PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- **ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

## Pin Assignments

AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	ANA_TRG
AO0_REF*	59	25	AO1_REF*
AO0_OUT*	58	24	AO1_OUT*
AOGND*	57	23	AOGND*
AL_CLK*	56	22	AL_TRG*
DGND	55	21	DGND
AO_CLK*	54	20	AO_TRG*
CNT0_CLK	53	19	CNT0_GA TE
CNT0_OUT	52	18	DGND
CNT1_CLK	51	17	CNT1_GA TE
CNT1_OUT	50	16	DGND
CNT2_CLK	49	15	CNT2_GA TE
CNT2_OUT	48	14	DGND
DIO0	47	13	DIO1
DIO2	46	12	DIO3
DIO4	45	11	DIO5
DIO6	44	10	DIO7
DGND	43	9	DGND
DIO8	42	8	DIO9
DIO10	41	7	DIO11
DIO12	40	6	DIO13
DIO14	39	5	DIO15
DGND	38	4	DGND
AI_TRG_OUT	37	3	AL_CLK_OUT
NC	36	2	NC
+12V	35	1	+5V

\*: Pin 20, 22~25, 54, 56~59 are not defined on PCI-1712L

## Block Diagram



## Feature Details

### PCI-bus Mastering Data Transfer

PCI-1712 and PCI-1712L support PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, PCI-1712 and PCI-1712L perform bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

### Plug & Play Function

PCI-1712 and PCI-1712L are Plug & Play devices, which fully complies with the PCI Specification Rev 2.2. During card installation, there is no need to set any jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug & Play function.

### On-board FIFO Memory

PCI-1712 provides an on-board FIFO (First In First Out) memory buffer, storing up to 1K samples for A/D and 32K for D/A conversion.

### Automatic Channel/Gain/SD\*/BU\* Scanning

PCI-1712 and PCI-1712L feature an automatic channel/Gain/SD/BU scanning circuit. This circuit controls multiplexer switching during sampling in a way that is much more efficient than software implementation. Onboard SRAM stores different gain, SD and BU values for each channel. This combination lets users perform multi-channel high-speed sampling with different gain, SD and BU values for each channel.

SD: Single-Ended/Differential; BU: Bipolar/Unipolar

### Flexible Triggering and Clocking Capabilities

PCI-1712 and PCI-1712L provide flexibility in triggering action, both in the available trigger modes and trigger events for analog input. You can acquire data using post-trigger, pre-trigger, delay-trigger and about-trigger modes. The trigger source could be either an analog or digital signal. The analog trigger could originate from a dedicated input pin. In fact, you can designate any of the analog input channels as the analog trigger input. You can set the analog trigger level within a voltage range from zero to A/D FSR. With the trigger signal being digital, you can pace A/D and D/A conversion using software interrupt, internal or external clock.

### Continuous Analog Output (PCI-1712 only)

PCI-1712 provides two analog output channels. Both can perform continuous waveform output. The analog output can be up to 500 kS/s for each analog output channel. Or you can load a cyclic waveform into an on-board FIFO, which will continuously output the cyclic waveform. The on-board FIFO of the PCI-1712 can store 2 to 32K samples of the waveform.

### On-board Programmable Multifunction Counter/Timer

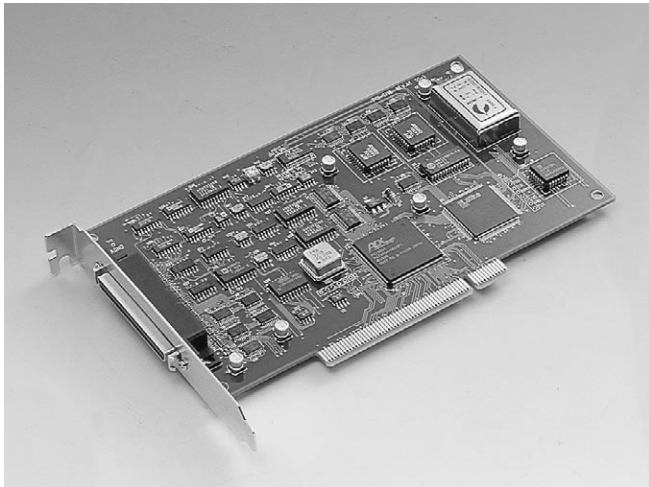
PCI-1712 and PCI-1712L are equipped with 3 programmable multifunction counter/timers, which can serve as a pacer trigger for A/D conversion. The counter chip is an 82C54 or equivalent, which incorporates three 16-bit channels on a 10 MHz clock. And then we enhance the gate and clock input function for more applications, of event counting, pulse generation, duty cycle frequency generation, one shot, frequency measurement and pulse width measurement.

# PCI-1716

# PCI-1716L

## 16-bit High-resolution Multifunction Card

## 16-bit High-resolution Multifunction Card w/o AO function



### Features

- 16-bit high resolution
- 250 kS/s sampling rate
- Auto calibration function
- PCI-bus mastering for data transfer
- 16 analog input channels with 1K FIFO
- 16 S.E. or 8 Diff. AI, or a combination
- Unipolar/Bipolar input range
- 2 analog output channels (PCI-1716 only)
- 16 digital input channels
- 16 digital output channels
- One 10 MHz 16-bit resolution counter
- BoardID™ Switch

### Introduction

PCI-1716 and PCI-1716L are powerful high-resolution multifunction cards for the PCI bus. They feature a 250 kS/s 16-bit A/D converter, and an on-board 1K sample FIFO buffer for A/D. The cards can also have up to sixteen single-ended or eight differential A/D input channels or a combination of these; two 16-bit D/A output channels, 16 digital input/output channels, and one 10 MHz 16-bit counter channel. PCI-1716 and PCI-1716L provide specific functions for different user requirements.

### Specifications

#### Analog Input

- Channels** 16 Single-Ended, 8 differential or combination
- Resolution** 16-bit
- FIFO Size** 1K samples
- Sampling Rate\*** 250 kS/s max.

Input range and Gain List	Gain	0.5	1	2	4	8
	Unipolar	N/A	0 ~10	0 ~5	0 ~2.5	0 ~1.25
Small Signal Bandwidth for PGA Gain	Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
	Gain	0.5	1	2	4	8
	Bandwidth	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz

- Common Mode Voltage** ± 11 V max. (operational)
- Max. Input Overvoltage** ±20 V
- Input Protection** 30 Vp-p
- Input Impedance** 100 M $\Omega$ /10 pF (Off); 100 M $\Omega$ /100pF (On)
- Trigger Mode** Software, Onboard Programmable Pacer or external

Accuracy	DC	DNLE: ±1 LSB					
		INLE: ±1 LSB					
		Zero (Offset) error: Adjustable ±1 LSB					
		Gain	0.5	1	2	4	8
		Gain error (%FSR)	0.15	0.03	0.03	0.05	0.1
	AC	SNR: 82 dB					
		ENOB: 13.5 bits					
		THD: -84 dB typical					
Clocking and Trigger Inputs	Trigger Mode	Software, on-board programmable pacer or external					
	A/D pacer clock	250 k Hz (max.); 58 $\mu$ Hz (min.)					
	External A/D trigger clock	Min. Pulse width: 2 $\mu$ s (high); 2 $\mu$ s (low)					
		Max. frequency: 250 KHz					

#### Note:

The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and other factors.

#### Digital Input /Output

Input Channels	16	
Input Voltage	Low	0.4 V max.
	High	2.4 V max.
Input Load	Low	0.4 V max.@ 0.2 mA
	High	2.7 V max.@ 2.0 $\mu$ A
Output Channels	16	
Output Voltage	Low	0.4 V max.@ 0.8 mA (sink)
	High	2.4 V min.@ -0.4 mA (source)

#### Counter/Timer

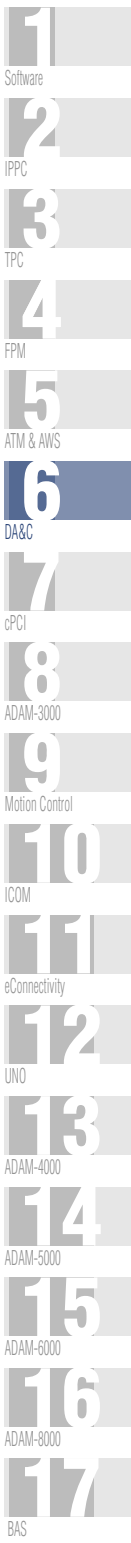
- Channels** 3 channels, 2 channels are permanently configured as programmable pacers; 1 channel is free for user application
- Resolution** 16-bit
- Compatibility** TTL level
- Base Clock** Channel 2: Takes input from output of channel 1  
Channel 1: 10 MHz  
Channel 0: Internal 1 MHz or external clock (10 MHz)  
max Selected by software
- Max. Input Frequency** 1 MHz

Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.5 V max. @ +24 mA
	High	2.4 V min. @ -15 mA

#### General

- I/O Connector Type** 68-pin SCSI-II female
- Dimensions** 175 x 100 mm (6.9" x 3.9")
- Power Consumption** Typical +5 V @ 850 mA, +12 V @ 600 mA  
Max. +5 V @ 1 A, +12 V @ 700 mA
- Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (refer to IEC 68-2-1, 2)
- Storage Temperature** -20 ~ 85° C (-4 ~ 158° F)
- Operating Humidity** 5 ~ 85% RH non-condensing (refer to IEC 68-1, -2, -3)
- Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-1, -2, -3)
- Certifications** CE

PCI-1716  
PCI-1716L



Software  
IPPC  
TPC  
FPM  
ATM & AWS  
DA&C  
cPCI  
ADAM-3000  
Motion Control  
ICOM  
eConnectivity  
UNO  
ADAM-4000  
ADAM-5000  
ADAM-6000  
ADAM-8000  
BAS

Analog Output (PCI-1716 only)

- Channels 2
- Resolution 16-bit
- Operation Mode Single output
- Throughput\* PC dependent, Software update (direct AO)

Output Range (Internal & External Reference)	Using Internal Reference	
	Using External Reference	
Accuracy	DC	0 ~ +5 V, 0 ~ +10 V, -5 ~ +5 V, -10 ~ +10 V
		0 ~ +x V @ +x V (-10 ≤ x ≤ 10)
		-x ~ +x V @ +x V (-10 ≤ x ≤ 10)
		DNLE: ±1 LSB (monotonic) INLE: ±1 LSB Zero (Offset) error: Adjustable ±1 LSB Gain (Full-scale) error: Adjustable ±1 LSB
Dynamic Performance	Settling Time	5 μs (to 4 LSB of FSB)
	Slew Rate	20 V/μs
Drift	10 ppm/° C	
Driving Capability	±20 mA	
Output Impedance	0.1 Ω max.	

- Drift 10 ppm/° C
- Driving Capability ±20 mA
- Output Impedance 0.1 Ω max.

Ordering Information

- PCI-1716 250 kS/s, 16-bit, 16-ch High-resolution Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- PCI-1716L 250 kS/s, 16-bit, 16-ch High-resolution Multifunction Card w/o analog output, user's manual and driver CD-ROM. (cable not included)
- PCLD-8710 Industrial Wiring Terminal Board with CJC circuit for DIN-rail Mounting. (cable not included)
- PCL-10168 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- ADAM-3968 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

Feature Details

PCI-Bus Mastering Data Transfer

PCI-1716 and PCI-1716L support PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, PCI-1716 and PCI-1716L performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Auto-calibration Function

PCI-1716 and PCI-1716L provide an auto-calibration function by using a calibration utility. The built-in calibration circuitry of the PCI-1716 and PCI-1716L corrects gain and offset errors in analog input and analog output channels thereby eliminating the need for external equipment and user adjustments.

BoardID™ Switch

PCI-1716 and PCI-1716L have a built-in BoardID™ DIP switch that helps define each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

Plug & Play Function

PCI-1716 and PCI-1716L are Plug & Play devices, which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches (Unless you are using several identical cards (See BoardID switch)). Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug & Play function.

Automatic Channel/Gain/SD\*/BU\* Scanning

PCI-1716 and PCI-1716L feature an automatic channel/gain/SD/BU scanning circuit. This circuit controls multiplexer switching during sampling in a way that is more efficient than software implementation. On-board SRAM stores different gain, SD and BU values for each channel. This combination lets users perform multi-channel high-speed sampling with different gain, SD and BU values for each channel.

SD: Single-Ended/Differential; BU: Bipolar/Unipolar

On-board FIFO Memory

PCI-1716 and PCI-1716L provide 1K sample on-board FIFO (First In First Out) memory buffer for AD. This is an important feature for faster data transfer and more predictable performance under the Windows system.

On-board Programmable Timer/Counter

PCI-1716 and PCI-1716L provide a programmable timer counter for generating a pacer trigger for the A/D conversion. The timer/counter chip is 82C54, which includes three 16-bit counter 10 MHz clocks. One counter is used as an event counter for counting events coming from the input channel. The other two are cascaded together to make a 32-bit timer for a pacer trigger time base.

Pin Assignments

A10	68	34	A11
A12	67	33	A13
A14	66	32	A15
A16	65	31	A17
A18	64	30	A19
A110	63	29	A111
A112	62	28	A113
A114	61	27	A115
AIGND	60	26	AIGND
*AO0_REF	59	25	AO1_REF*
*AO0_OUT	58	24	AO1_OUT*
*AOGND	57	23	AOGND*
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

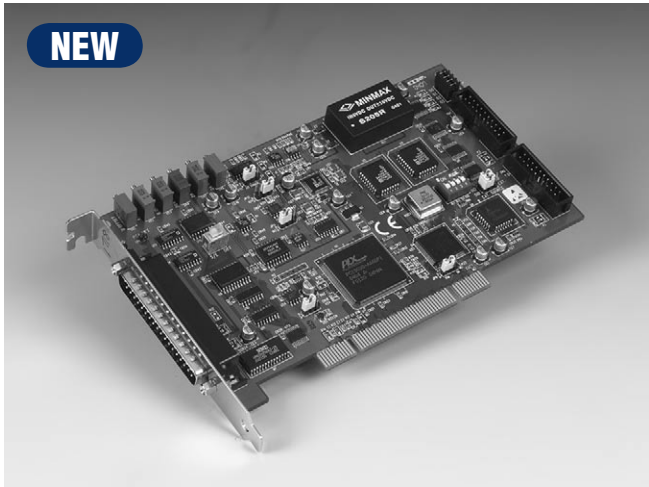
\*: Pins 23~25 and pins 57~59 are not defined for the PCI-1716L

# PCI-1718H DU

# PCI-1718H GU

12-bit Multi-function Card with PCI BUS

12-bit High-gain Multi-function card with PCI BUS (ISA Compatible)



## Introduction

PCI-1718H DU/GU is a multifunction data acquisition card based on the PCI bus. It offers the five most desired measurement and control functions: 12-bit A/D conversion, 12-bit D/A conversion, digital input, digital output, and counter/timer.

### PCI-Bus Plug & Play

The PCI-1718H DU/GU uses a PCI controller to interface the card to the PCI bus. The controller fully implements the PCI bus specification Rev 2.2. All bus relative configurations, such as base address and interrupt assignment, are automatically controlled by software. No jumper or DIP switch is required for user configuration.

### Automatic Channel/Gain/ SD Scanning

PCI-1718H DU/GU features an automatic channel/Gain/SD scanning circuit. This circuit, instead of your software, controls multiplexer switching during sampling. On-board SRAM stores different gain and SD values for each channel. This combination lets user perform multi-channel high-speed sampling (up to 100kHz) with different gains and SD for each channel.

### On-board FIFO

There are 4k samples FIFO for A/D (AI) on PCI-1718H DU/1718H GU. This is an important feature for faster data transfer and more predictable performance under Windows system.

### On Board Programmable Timer/Counter

PCI-1718H DU/1718H GU provides a programmable timer counter for generating pacer trigger for the A/D conversion. The timer/counter chip is 82C54, which includes three 16-bit counters of 10 MHz clock. One counter is used as an event counter for counting events coming from the input channel. The other two are cascaded together to make a 32-bit timer for pacer trigger time base.

## Specifications

### Analog Input

- Channels 16 single-ended or 8 differential or combination
- Resolution 12-bit
- FIFO Size 4 K samples
- Max. Sampling Rate 100 kS/s

Input range and Gain List for PCI-1718HDU/HGU	Gain	0.5	1	2		4		8	
	Unipolar	N/A	0-10	0-5		0-2.5		0-1.25	
	Bipolar	±10	±5	±2.5		±1.25		±0.625	
Input range and Gain List for PCI-1718HDU/HGU	Gain	0.5	1	5	10	50	100	500	1000
	Unipolar	N/A	0~10	N/A	0~1	N/A	0~0.1	N/A	0~0.01
	Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
PCI-1718HDU/HGU PGA Bandwidth	Gain	0.5, 1		2		4		8	
	Bandwidth	5.0 MHz		4.0 MHz		1.3 MHz		0.6 MHz	

PCI-1718H DU/ HGU PGA Bandwidth	Gain	0.5, 1	5, 10	50, 100	500, 1000
	Bandwidth	1.0 MHz	80 kHz	10 kHz	1 kHz
Drift	Zero (µV/.)	15			
	Gain (ppm/.)	40			

- Common Mode Voltage ±11 V max. (operational)
- Max. Input voltage ±15 V
- Input Protection 30 Vp-p
- Input Impedance 100 MΩ/10pF(Off); 100 MΩ/100pF(On)
- Trigger Mode Software, on-board or external programmable pacer

PCI-1718H DU/HGU Accuracy	DC	DNLE: ±1LSB					
		INLE: ±1LSB					
		Offset error: Adjustable to 0					
		Gain	0.5	1	2	4	8
		Gain error(% FSR)	0.01	0.01	0.02	0.02	0.04
	AC	THD: -80 dB					
		ENOB: 11 bits					

PCI-1718H DU  
PCI-1718H GU

PCI-1718H DU/HGU Accuracy	DC	DNLE: $\pm 1$ LSB					
		INLE: $\pm 1$ LSB					
		Offset error: Adjustable to 0					
		Gain	0.5, 1	5, 10	50, 100	500	1000
		Gain error(% FSR)	0.01	0.02	0.02	0.04	0.08
	AC	THD: -80 dB					
External TTL Trigger Input	Low	ENOB: 11 bits					
		0.8 V max.					
	High	2.0 V min.					

Analog Output

- Channels 1
- Resolution 12-bit
- Max. Transfer Rate 100 kS/s

Output Range (Internal & External Reference)	Using Internal Reference	0 ~ +5 V, 0 ~ +10 V
	Using External Reference	0 ~ x V @ x V (-10 $\leq$ x $\leq$ 10)
Accuracy	INLE	$\pm 1$ LSB
	DNLE	$\pm 1$ LSB (monotonic)
	Offset error	Adjustable to $\pm 1$ LSB
	Gain error	Adjustable to $\pm 1$ LSB
Dynamic Performance	Slew Rate	10 V/ $\mu$ s
	Settling Time	2 $\mu$ s to 0.01% of FSR

- Drift 10 ppm/ $^{\circ}$ C
- Driving Capability  $\pm 10$ mA
- Output Impedance 0.1  $\Omega$  max.

Digital Input

Input Channels	16	
Input Voltage	Low	0.4 V max.
	High	2.4 V min.
Input Load	Low	0.4 V max.@ -0.2 mA
	High	2.7 V min.@ 20 $\mu$ A

Digital Output

Output Channels	16	
Output Voltage	Low	0.4 V max.@ +8.0 mA (sink)
	High	2.4 V min.@ -0.4 mA(source)

Counter/Timer

- Counter Chip 82C54 or equivalent
- Channels 3 channels, 2 channels are permanently configured as programmable pacers; 1 channel is free for user application
- Resolution 16 bit
- Compatibility TTL level
- Base Clock Channel 1: 10 MHz  
Channel 2: Takes input from output of channel 1  
Channel 0: Internal 100 kHz or external clock (10 MHz max.) selected by software
- Max. Input Frequency 10 MHz

Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.5 V max.@ +24 mA
	High	2.4 V min.@ -15 mA

General

- I/O Connector Type 37-pin DSUB female for Analog One 20-pin Box Header for DI One 20-pin Box Header for DO
- Dimensions 175 x 100 mm (6.9" x 3.9")

Power Consumption	Typical	+5 V @ 850 mA
	Max.	+5 V @ 1 A

Temperature	Operating	0 ~ 60 $^{\circ}$ C (32 ~ 158 $^{\circ}$ F)
	Storage	-20 ~ 70 $^{\circ}$ C (-4 ~ 158 $^{\circ}$ F)
Relative Humidity	Operating	5~85%RH non-condensing (refer to IEC 68-1,-2,-3)
	Storage	5~95%RH non-condensing (refer to IEC 68-1,-2,-3)
Certification	CE certified	

Ordering Information

- PCI-1718H DU 12-bit multi-function card with PCI bus
- PCI-1718H GU 12-bit high-gain multi-function card with PCI bus
- PCL-10120-1 20-pin flat cable, 1m
- PCL-10120-2 20-pin flat cable, 2m
- PCL-10137-1 DB37 cable assembly, 1m
- PCL-10137-2 DB37 cable assembly, 2m
- PCL-10137-3 DB37 cable assembly, 3m
- PCLD-8115 Wiring terminal board CE

Pin Assignments

A/D S0	1	20	A/D S8
A/D S1	2	21	A/D S9
A/D S2	3	22	A/D S10
A/D S3	4	23	A/D S11
A/D S4	5	24	A/D S12
A/D S5	6	25	A/D S13
A/D S6	7	26	A/D S14
A/D S7	8	27	A/D S15
A.GND	9	28	A.GND
A.GND	10	29	A.GND
V.REF	11	30	DA0.OUT
S0*	12	31	DA0.VREF
+12 V	13	32	S1*
S2*	14	33	S3*
D.GND	15	34	D.GND
NC	16	35	EXT.TRIG
Counter 0 CLK	17	36	Counter 0 GATE
Counter 0 OUT	18	37	PACER
+5V	19		

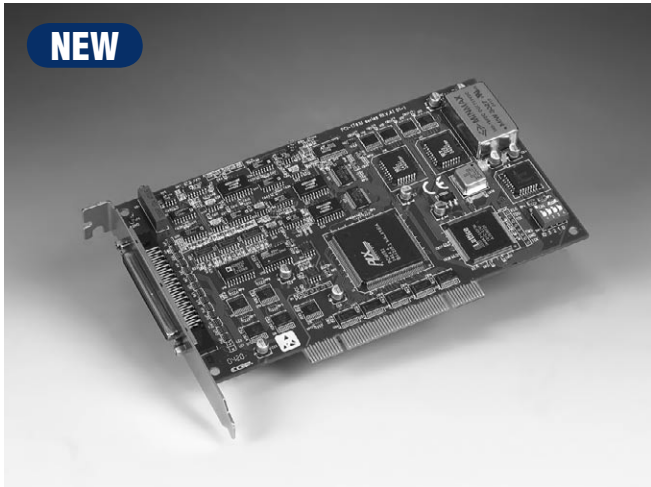
A/D S0	1	20	A/D S8		A/D H0	1	20	A/D L0
A/D S1	2	21	A/D S9		A/D H1	2	21	A/D L1
A/D S2	3	22	A/D S10		A/D H2	3	22	A/D L2
A/D S3	4	23	A/D S11		A/D H3	4	23	A/D L3
A/D S4	5	24	A/D S12		A/D H4	5	24	A/D L4
A/D S5	6	25	A/D S13		A/D H5	6	25	A/D L5
A/D S6	7	26	A/D S14		A/D H6	7	26	A/D L6
A/D S7	8	27	A/D S15		A/D H7	8	27	A/D L7
A.GND	9	28	A.GND		A.GND	9	28	A.GND
A.GND	10	29	A.GND		A.GND	10	29	A.GND
V.REF	11	30	DA0.OUT		A.GND	11	30	DA0.OUT
S0*	12	31	DA0.VREF		V.REF	12	31	DA0.VREF
+12 V	13	32	S1*		S0*	13	32	S1*
S2*	14	33	S3*		+12 V	13	32	S1*
D.GND	15	34	D.GND		S2*	14	33	S3*
NC	16	35	EXT.TRIG		D.GND	15	34	D.GND
Counter 0 CLK	17	36	Counter 0 GATE		NC	16	35	EXT.TRIG
Counter 0 OUT	18	37	PACER		Counter 0 CLK	17	36	Counter 0 GATE
+5V	19				Counter 0 OUT	18	37	PACER
					+5V	19		



# PCI-1741U

16-bit, 200 kS/s Low cost  
Multifunction card w/AO

NEW



## Features

- 16-bit high resolution
- 200 kS/s sampling rate
- Auto calibration function
- 16 S.E. or 8 Diff. AI
- Unipolar/Bipolar input range
- 1 K samples FIFO for AI
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

## Introduction

PCI-1741U is a powerful high-resolution multifunction DAS card for the PCI bus. Its sampling rate is up to 200 kS/s and the 16-bit resolution makes it suitable for most data acquisition applications. PCI-1741U provides 16 single-ended or 8 differential analog input channels, one 16-bit D/A output channel, 16 digital input/output channels, and one 10 MHz 16-bit counter channel.

### Auto-calibration Function

PCI-1741U provides an auto-calibration function by using a calibration utility. The built-in calibration circuitry of the PCI-1741U corrects gain and offset errors in analog input and analog output channels thereby eliminating the need for external equipment and user adjustments.

### BoardID™ Switch

PCI-1741U has a built-in BoardID™ DIP switch that helps define each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

### Plug & Play Function

The PCI-1741U is a Plug & Play device, which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug & Play function.

### On-board FIFO Memory

The PCI-1741U provides 1K samples on-board FIFO (First In First Out) memory buffer for AD. This is an important feature for faster data transfer and more predictable performance under the Windows system.

### On Board Programmable Timer/Counter

The PCI-1741U provides a programmable timer counter for generating a pacer trigger for the A/D conversion. The timer/counter chip is 82C54, which includes three 16-bit counter 10 MHz clocks. One counter is used as an event counter for counting events coming from the input channel. The other two are cascaded together to make a 32-bit timer for pacer trigger time base.

## Specifications

### Analog Input

- **Channels** 16 single-ended or 8 differential or combination
- **Resolution** 16-bit
- **FIFO Size** 1 K samples
- **Max. Sampling Rate** 200 kS/s

Input range and Gain List	Gain	0.5	1	2	4	8
	Unipolar	N/A	0~10	0~5	0~2.5	0~1.25
Bandwidth for PGA	Bipolar	±10	±5	±2.5	±1.25	±0.625
	Gain	0.5	1	2	4	8
Bandwidth for PGA	Bandwidth	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz

- **Common mode voltage** ±11 V max. (operational)
- **Max. Input voltage** ±20 V (protection)
- **Input Protect** 30Vp-p
- **Input Impedance** 100 MΩ/10pF(Off); 100 MΩ/100pF(On)

Accuracy	DC	DNLE: $\pm 1$ LSB					
		INLE: $\pm 1$ LSB					
		Zero (Offset) error: Adjustable to $\pm 1$ LSB					
		Gain	0.5	1	2	4	8
		Gain error (% FSR)	0.03	0.02	0.02	0.03	0.04
	AC	THD: -90 dB					
		ENOB: 13.5 bits					
Clocking and Trigger Inputs	Trigger Mode	Software, on-board programmable pacer or external					
	A/D pacer clock	200 kHz (max.); 2.328MHz (min.)					

### Analog Output

- **Channels** 1
- **Resolution** 16-bit
- **Operation mode** Single output
- **Throughput** PC dependent, Software update (Direct AO)



PCI-1741U

Output Range (Internal & External Reference)	Using Internal Reference	0 ~ +5 V, 0 ~ +10 V, -5 ~ +5 V, -10 ~ +10 V
	Using External Reference	0 ~ +x V @ +x V (-10.x.10) -x ~ +x V @ +x V (-10.x.10)
Accuracy	DC	DNLE: ±1LSB (monotonic)
		INLE: ±1LSB
		Zero (Offset) error: Adjustable to ±1 LSB
		Gain (Full-scale) error: Adjustable to ±1 LSB
Dynamic Performance	Settling Time	5µs (to 4 LSB of FSR)
	Slew Rate	20 V/µs

- Drift 10 ppm/.
- Driving Capability ±20 mA
- Output Impedance 0.1 Ω max.

Digital Input /Output

- Input Channels 16
- Output Channels 16
- Number of Ports 2

Input Voltage	Low	0.8 V max.
	High	2.0 V min.
Output Voltage	Low	0.5 V max. @ +24 mA (sink)
	High	2.4 V min. @ -15 mA (source)
	High	2.0 V min.

Counter/Timer

- Counter Chip 82C54 or equivalent
- Channels 3 channels, 2 channels are permanently configured as programmable pacers; 1 channel is free for user application
- Counter 0 16-bit counter
- Counter 1, 2 Cascade as a 32-bit clock divider for pacer clock for A/D conversion
- Resolution 16-bit
- Base Clock Channel 1: 10 MHz  
Channel 2: Takes input from output of channel 1  
Channel 0: Internal 100 kHz or external
- Compatibility TTL level

Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.5 V max. @ +24 mA (sink)
	High	2.4 V min. @ -15 mA (source)

General

- I/O Connector Type 68-pin SCSI-II female
- Dimensions 175 x 100 mm (6.9" x 3.9")

Power Consumption	Typical	+5 V @ 850 mA +12 V @ 600 mA
	Max.	+5 V @ 1 A +12 V @ 700 mA
Temperature	Operation	0 ~ 60 °C (32 ~ 158 °F) (refer to IEC 68-2-1, 2)
	Storage	-20 ~ 70 °C (-4 ~ 185 °F)

- Relative Humidity 5 ~ 95%RH non-condensing (refer to IEC 68-2-3)
- Certifications CE certified

Pin Assignments

AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
AO0_REF	59	25	AO1_REF
AO0_OUT	58	24	AO1_OUT
AOGND	57	23	AOGND
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

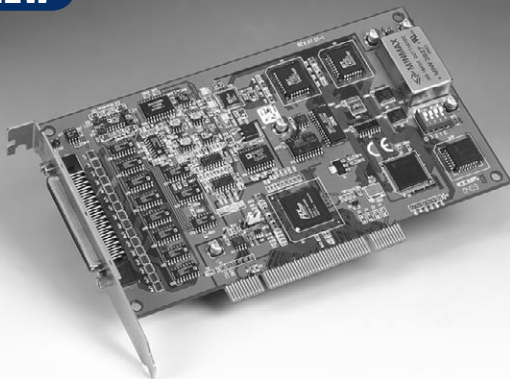
Ordering Information

- PCI-1741U 200 kS/s, 16-bit, 16-ch High-Resolution Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- PCL-10168 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1m.
- PCL-10168-2 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 2m.
- ADAM-3968 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting
- PCLD-8710 Industrial Wiring Terminal Board with CJC circuit for DIN-rail Mounting. (cable not included)
- PCI-1741S PCI-1741U with PCLD-8710 and PCL-10168 cable

# PCI-1747U

250 kS/s, 16-bit, 64-ch Analog Input Card

NEW



## Features

- 16-bit high resolution
- 250 kS/s sampling rate
- 64 S.E. or 32 Diff. AI, or a combination
- Auto calibration function
- Unipolar/Bipolar input range
- 1k samples FIFO for AI
- Bus master DMA data transfer
- Universal PCI Bus
- BoardID™ switch

## Introduction

PCI-1747U is a high-resolution high channel count analog input card for the PCI bus. Its sampling rate is up to 250 kS/s and 16-bit resolution provides the power needed for most data acquisition applications. PCI-1747U provides 64 single-ended, 32 differential analog input channels or a combination of these. It also has built in a 1k-sample FIFO buffer for analog input data.

## Specifications

### Analog Input

- Channels** 64 single-ended or 32 differential or combination
- Resolution** 16-bit
- FIFO Size** 1 K samples
- Max. Sampling Rate** 250 kS/s

Input range and Gain List	Gain	0.5	1	2	4	8
	Unipolar	N/A	0~10	0~5	0~2.5	0~1.25
Bandwidth for PGA	Gain	0.5	1	2	4	8
	Bandwidth	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz

- Common mode voltage**  $\pm 11$  V max. (operational)
- Max. Input voltage**  $\pm 20$  V
- Input Protect** 30 Vp-p
- Input Impedance** 100 M $\Omega$ /10pF(Off); 100 M $\Omega$ /100pF(On)

Accuracy	DC	DNLE: $\pm 1$ LSB					
		INLE: $\pm 1$ LSB					
		Zero (Offset) error: Adjustable to $\pm 1$ LSB					
		Gain	0.5	1	2	4	8
		Gain error (% FSR)	0.03	0.02	0.02	0.03	0.04
Clocking and Trigger Inputs	AC	THD: -90 dB					
		ENOB: 13.5 bits					
	Trigger Mode	Software, on-board programmable pacer or external					
Clocking and Trigger Inputs	A/D pacer clock	250 kHz (max.); 2.328MHz (min.)					

### Counter/Timer

- Counter chip** 82C54 or equivalent
- Channels** 3 channels, 2 channels are permanently configured as programmable pacers; 1 channel is for internal use only

- Resolution** 16-bit
- Base Clock** Channel 1: 10 MHz  
Channel 2: Takes input from output of channel 1  
Channel 0: Internal 100 kHz
- Counter 0** 16-bit timer
- Counter 1, 2** Cascade as a 32-bit clock divider for pacer clock for A/D conversion

### General

- I/O Connector Type** 68-pin SCSI-II female
- Dimensions** 175 x 100 mm (6.9" x 3.9")

Power Consumption	Typical	+5 V @ 850 mA +12 V @ 600 mA
	Max.	+5 V @ 1 A +12 V @ 700 m A
Temperature	Operating	0 ~ 60 °C (32 ~ 158 °F) (refer to IEC 68-2-1,2)
	Storage	-20 ~ 70°C (-4 ~ 185°F)

- Relative Humidity** 5 ~ 95%RH non-condensing (refer to IEC 68-2-3)
- Certifications** CE certified

## Ordering Information:

- PCI-1747U** 250 kS/s, 16-bit, 64-ch, analog input universal PCI bus card
- ADAM-3968** 68-pin SCSI cable wiring terminal for DIN-rail mounting
- PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1m.
- PCL-10168-2** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 2m.

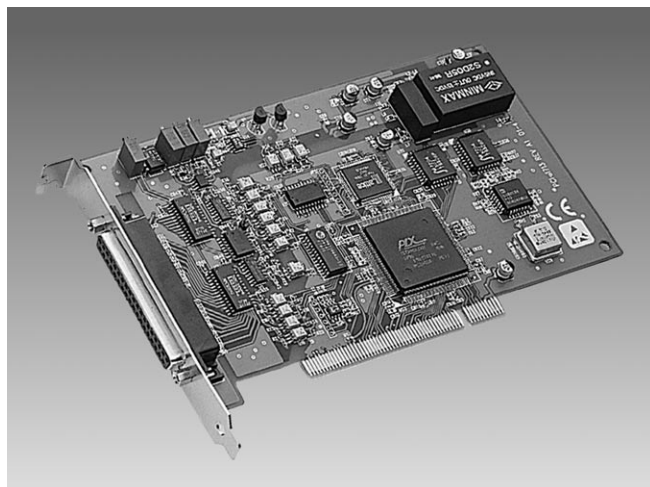
## Pin Assignments

PCI-1747U provides 1K samples on-board FIFO (First In First Out) memory buffer for AD. This is an important feature for faster data transfer and more predictable performance under the Windows system.

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

# PCI-1713

100 kS/s, 12-bit, 32-ch,  
Isolated Analog Input Card



CE

## Features

- 2500 V<sub>DC</sub> isolation protection
- 32 single-ended or 16 differential analog inputs, or a combination
- 12-bit resolution for A/D conversion
- Up to 100 kS/s sampling rate for A/D conversion
- Programmable gain for each input channel
- On-board 4 K samples FIFO buffer
- S/W, internal or external pacer triggering supported

## Introduction

The PCI-1713 is an isolated high-speed analog input card for the PCI bus. It provides 32 analog input channels with a sampling rate up to 100 kS/s, 12-bit resolution and isolation protection of 2500 V<sub>DC</sub>.

## Specifications

### Analog Input

- **Channels** 32 single-ended or 16 differential (software programmable)
- **Resolution** 12-bit
- **Onboard FIFO** 4K samples
- **Input Range** Bipolar:  $\pm 10$  V,  $\pm 5$  V,  $\pm 2.5$  V,  $\pm 1.25$  V,  $\pm 0.625$  V (software programmable)  
Unipolar: 0 ~ 10 V, 0 ~ 5 V, 0 ~ 2.5 V, 0 ~ 1.25 V
- **Maximum Input Overvoltage**  $\pm 30$  V
- **Common Mode Rejection Ratio(CMRR)**

Gain	CMRR
0.5, 1	75dB
2	80dB
4	84dB
8	84dB
- **Maximum Sampling Rate** 100 kS/s
- **Accuracy** (depends on gain)

Gain	Accuracy
0.5, 1	0.01% of FSR $\pm$ 1LSB
2	0.02% of FSR $\pm$ 1LSB
4	0.02% of FSR $\pm$ 1LSB
8	0.04% of FSR $\pm$ 1LSB
- **Linearity Error**  $\pm 1$  LSB
- **Input Impedance** 1 G $\Omega$
- **Trigger Mode** Software, on-board programmable pacer or external (TTL level)

### Programmable Pacer

- **Timer** 32-bit programmable timer
- **Time Base** 10 MHz

### General

- **I/O Connector** 37-pin D-type female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** +5 V @ 850 mA (Typical), +5 V @ 1.0 A (Max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

## Ordering Information

- **PCI-1713** 100 kS/s, 12-bit, 32-channel Isolated Analog Input Card, user's manual and driver CD-ROM. (cable not included)
- **PCLD-881B** Industrial Wiring Terminal Board (cable not included)
- **ADAM-3937** Wiring Terminal Board
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m

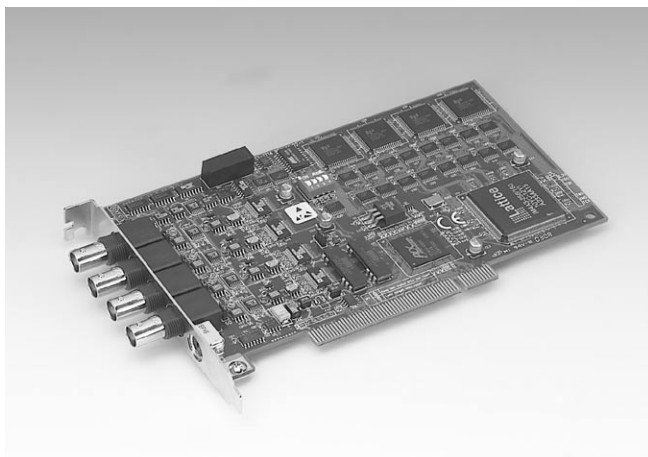
## Applications

- Signal isolation
- Process monitoring and control
- Transducer/sensor interfacing
- Multi-channel DC voltage measurement

# PCI-1714 PCI-1714UL

30 MS/s Simultaneous 4-ch Analog Input Card

10 MS/s Simultaneous 4-ch Analog Input Card



## Introduction

The PCI-1714 is an advanced-performance data acquisition card based on 32-bit PCI bus architecture. The maximum sampling rate of PCI-1714 is up to 30 MS/s, with an emphasis on continuous, non-stop, high-speed, streaming data of A/D samples to host memory.

## Specifications

### Analog Input

- Channels** 4 single-ended analog input channels
- Resolution** 12 bits
- FIFO Size** 32 K samples/ch for PCI-1714  
8 K samples/ch for PCI-1714UL
- Max. Sampling Rate** 30 MS/s for PCI-1714  
10 MS/s for PCI-1714UL

### General

- I/O Connector Type** 4 BNC connector (for AI)  
1 PS2 connector (for Ext. clock and trig)
- Dimensions** 137 x 107 mm (5.4" x 4.2")
- Power Consumption** Typical +5 V @ 850 mA ; +12 V @ 600 mA  
Max. +5 V @ 1 A ; +12 V @ 700m A
- Operating Temperature** 0 ~ 70° C (32~158° F)
- Storage Temperature** -20 ~ 85° C (-4~185° F)
- Relative Humidity** 5 ~ 95%RH non-condensing (refer to IEC 68-2-3)
- Certifications** CE

### Analog Input:

Channels	4 single-ended analog input channels				
Resolution	12-bit				
FIFO Size	32K locations (8K for PCI-1714UL)				
Max. Sampling Rate <sup>1</sup>	30MHz 10MHz for PCI-1714UL				
Input range and Gain List	Gain	1	2	5	10
	Range	±5V	±2.5V	±1V	±0.5V
Drift	Gain	1	2	5	10
	Zero (µV/° C)	±30	±30	±30	±30
	Gain (ppm/° C)	±30	±30	±30	±30
Small Signal Bandwidth for PGA	Gain	1	2	5	10
	Bandwidth (-3dB)	7 MHz	7 MHz	7 MHz	7 MHz
Max. Input voltage	±15 V		Input Surge Protect		30 Vp-p
Input Impedance	50Ω/1MΩ/Hi Z jumper selectable /100pF				
Trigger Mode	Software, pacer, post-trigger, pre-trigger, delay-trigger, about-trigger				
Accuracy	DC	DNLE	±1LSB (No Missing Codes:12 Bits Guaranteed)		
		INLE	±2LSB		
		Offset error	Adjustable to ±1LSB		
		Gain error	Adjustable to ±1LSB		

## Features

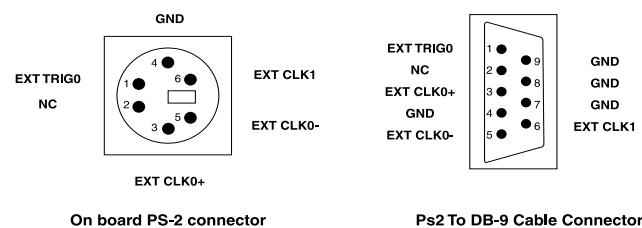
- 12-bit A/D converter up to 30 MS/s
- 4 single-ended analog input channels
- Programmable gain for each input channel
- 32 K samples on board FIFO memory
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/counter
- BoardID™ switch

Accuracy	AC	SINAD S/(N+D)	68 dB
		ENOB	11bits
		THD	-75 dB
External Clock 1	Logic level	TTL (Low: 0.8 V max. High: 2.0 V min.)	
	Input impedance	50 Ω	
	Input coupled	DC	
External Clock 0	Frequency	Up to 30 MHzUp to 10 MHz for PCI-1714UL	
	Logic level	5.0V peak to peak sin wave	
	Input impedance	Hi Z	
External Trigger 0	Input coupled	AC	
	Frequency	Up to 30 MHzUp to 10 MHz for PCI-1714UL	
	Logic level	TTL (Low: 0.8 V max. High: 2.0V min.)	
External Analog Trigger Input	Input impedance	Hi Z	
	Input coupled	DC	
	Range	By analog input range	
	Resolution	8-bit	
	Frequency	Up to 1MHz	

## Ordering Information

- PCI-1714** 30 MHz Simultaneous 4-ch Analog Input Card, user's manual and driver CD-ROM (PCL-10901-1 cable included)
- PCI-1714UL** 10MHz Simultaneous 4-ch Analog Input card
- ADAM-3909** DB-9 Wiring Terminal for DIN-rail Mounting
- PCL-10901-1** PS2 to DB9 Wiring Cable, 1m
- PCL-10901-3** PS2 to DB9 Wiring Cable, 3m
- PCL-1010B-1** BNC to BNC Wiring Cable, 1m

## Pin Assignments



1  
Software

2  
IPPC

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TPC

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FPM

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ATM & AWS

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DA&C

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cPCI

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ADAM-3000

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Motion Control

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ICOM

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eConnectivity

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UNO

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ADAM-4000

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ADAM-5000

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ADAM-6000

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ADAM-8000

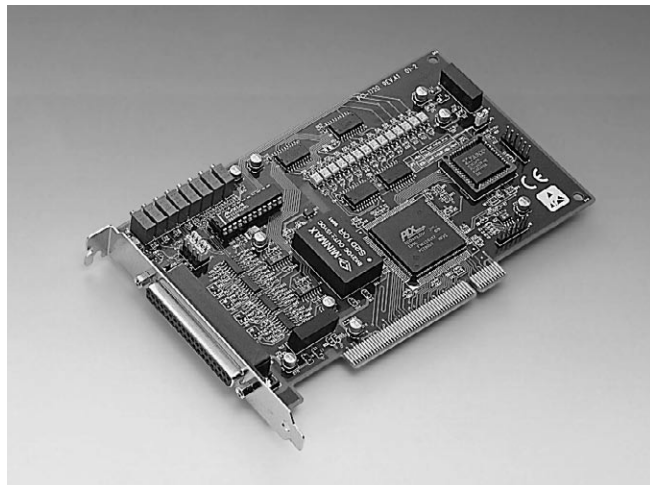
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BAS



# PCI-1720 PCI-1720U

## 4-ch Isolated Analog Output Card

## 4-ch Universal Isolated Analog Output Card



CE

### Features

- Four 12-bit D/A output channels
- Multiple output ranges
- 2,500 V<sub>DC</sub> isolation between the outputs and the PCI bus
- Keeps the output settings and values after system reset
- One DB37 connector for easy wiring
- Universal PCI and BoardID switch (PCI-1720U only)

### Introduction

The PCI-1720 provides four 12-bit isolated digital-to-analog outputs for the PCI bus. With isolation protection of 2500 V<sub>DC</sub> between the outputs and the PCI bus, the PCI-1720 is ideal for industrial applications where high-voltage protection is required.

#### Keeping the Output Settings and Values after System Reset

Users can independently set the four outputs to different ranges: 0 to +5 V, 0 to +10 V, ±5 V, ±10 V, 0 to 20 mA (sink) or 4 to 20 mA (sink). When the system is hot reset, (power is not shut off), the PCI-1720 can either retain the last analog output settings and values, or return to its default configuration, depending on jumper setting. This practical function eliminates danger caused by misoperation during an unexpected system reset.

#### PCI-Bus Plug & Play

The PCI-1720 uses a PCI controller to interface the card to the PCI bus. The controller fully implements the PCI bus specification Rev 2.1. All bus relative configurations, such as base address and interrupt assignment, are automatically controlled by software.

### Specifications

- Channels** 4 isolated D/A channels
- Resolution** 12 bits
- Output Range** Unipolar: 0 ~ +5 V, 0 ~ +10 V  
Bipolar: ±5 V, ±10 V  
Current loop (sink): 0~ 20 mA, 4 ~ 20 mA
- Throughput** 15 kHz min. @ full-scale output range
- Accuracy** ±0.024%
- Isolation Voltage** 2,500 V<sub>DC</sub> between the outputs and the PCI bus
- Temperature Drift** Typical: 10 PPM/°C (0 ~ 60° C) (32 ~ 140° F)  
Maximum: 20 PPM/°C (0 ~ 60° C) (32 ~ 140° F)
- Output Drive** ±5 mA max.
- Current Loop Excitation Voltage** 50 V (max.)
- On-board 12 VDC Excitation Voltage** 80 mA (max.)
- Power Consumption** +5 V @ 350 mA (typical), 500 mA (max.)  
+12 V @ 200 mA (typical), 350 mA (max.)
- Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- Storage Temperature** -20 ~ +70° C (-4 ~ 158° F)
- Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Connector** DB-37 connector
- Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")

- PCI-1720U** 4-channel Isolated Output Card, user's manual and driver CD-ROM. (cable not included)
- ADAM-3937** DB37 Wiring terminal for DIN-rail mounting
- PCLD-880** Screw terminal board

### Applications

- Process control
- Programmable voltage source
- Programmable current sink
- Servo control

### Pin Assignments

NC	1	20	NC
+12 Vout	2	21	NC
AGND	3	22	NC
AGND	4	23	NC
Vout 0	5	24	NC
AGND	6	25	NC
Isink 0	7	26	NC
AGND	8	27	NC
AGND	9	28	NC
Isink 1	10	29	NC
Vout 2	11	30	NC
AGND	12	31	NC
Isink 2	13	32	NC
Vout 3	14	33	NC
AGND	15	34	NC
Isink 3	16	35	NC
NC	17	36	NC
NC	18	37	NC
NC	19		

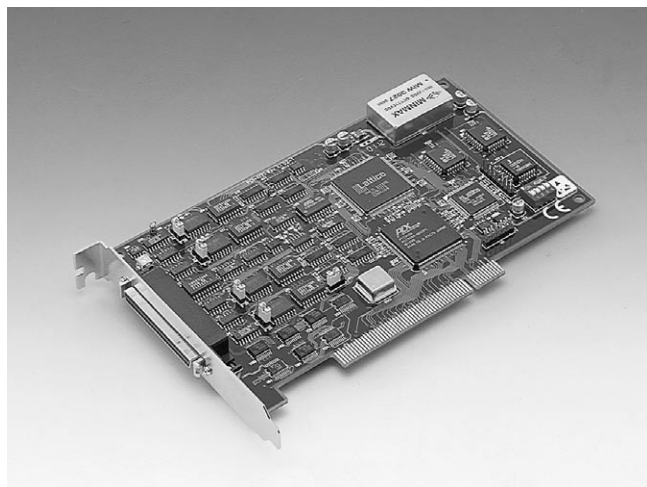
### Ordering Information

- PCI-1720** 4-channel Isolated Output Card, user's manual and driver CD-ROM. (cable not included)
- PCL-10137-1** DB37 cable assembly, 1m
- PCL-10137-2** DB37 cable assembly, 2m
- PCL-10137-3** DB37 cable assembly, 3m



# PCI-1721

## 12-bit, 4-ch Advanced Analog Output Card



FCC CE

### Features

- 10 MHz maximum digital update rate
- PCI-bus mastering for data transfer
- Auto calibration function
- Four analog output channels with 1 K FIFO
- A 12-bit DAC is equipped for each of analog output channels
- Real-time waveform output function with internal/external pacer
- Synchronized output function
- Flexible output types and range settings
- Keeps the output settings and values after system reset
- 16-ch DI/O and one 10 MHz 16-bit resolution counter
- BoardID™ switch

### Introduction

The PCI-1721 is an advanced high-speed analog output card for PCI bus, and each of analog output channels are equipped with a 12-bit, double-buffered DAC. It features many powerful and unique functions, like a waveform output function with 10 MHz maximum update rate, auto-calibration and a BoardID switch. The PCI-1721 is an ideal solution for industrial applications where high-speed continuous analog output or real-time waveform output functions are required.

### Specifications

#### Analog Output

- Channels** 4
- Resolution** 12-bit
- FIFO Size** 1 K Samples
- Operation Mode** Single/ Continuous/ Waveform /Synchronized output

Output Range (Internal & External Reference)	Using Internal Reference	0 ~ +5 V, 0 ~ +10 V, -5 ~ +5 V, -10 ~ +10 V, 0 ~ 20 mA, 4 ~ 20 mA
	Using External Reference	0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)
Accuracy	Relative	±1 LSB
	Differential Non- linearity	±1 LSB (monotonic)

- Offset** <1 LSB
- Slew Rate** 10 V/μs
- Driving Capability** ±10 mA
- Output Impedance** 0.1Ω max.
- Max. Update Rate** 10 MHz (max. for one channel)
- Settling Time** 5 μs (to ±1/1 LSB of FSR)

External Clock Input (Max. 10 MHz)	Low	0.8 V max.
	High	2.0 V min.
External TTL Trigger Input	Low	0.8 V max.
	High	2.0 V min.

#### Counter/Timer

- Channels** 1
- Resolution** 16-bit
- Compatibility** TTL level
- Base Clock** 10 MHz
- Max. Input Frequency** 10 MHz

Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.4 V max. @ +2.5 mA
	High	3.0 V min. @ -2.5 mA

#### General

I/O Connector Type	68-pin SCSI-II female	
Dimensions	175 x 100 mm (6.9" x 3.9")	
Power Consumption	Typical	+5 V @ 850 mA, +12 V @ 600 mA
	Max.	+5 V @ 1 A, +12 V @ 700 mA
Temperature	Operation	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
	Storage	-20 ~ 85° C (-4 ~ 185° F)
Relative Humidity	5 ~ 95% RH non-condensing (refer to IEC 68-2-3)	
Certifications	CE certified	

#### Digital Input /Output

Input Channels	16 (bi-directional)	
Number of Ports	2	
Input Voltage	Low	0.8 V max.
	High	2.0 V min.
Input Load	Low	0.5 V max. @ +24 mA (sink)
	High	2.0 V min. @ -15 mA (source)

### Ordering Information

- PCI-1721** 12-bit, 4-ch Advanced Analog Output Card, user's manual and driver CD-ROM. (cable not included)
- PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

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Software

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IPPC

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TPC

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FPM

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ATM & AWS

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DA&C

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cPCI

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ADAM-3000

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Motion Control

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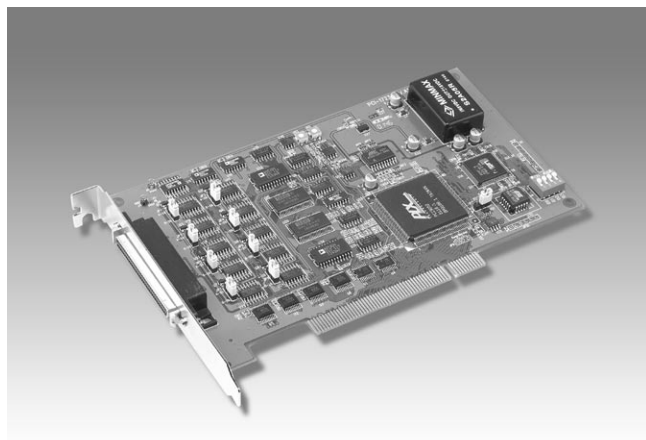
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ADAM-6000

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ADAM-8000

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BAS

# PCI-1723

## 16-bit, 8-ch Non-isolated Analog Output Card



CE

### Features

- Auto calibration function
- A 16-bit DAC is equipped for each analog output channel
- Synchronized output function
- Output values retained after system hot reset
- 2-port (16-channel) user-defined digital input/output
- BoardID™ switch

### Introduction

The PCI-1723 is a non-isolated multiple channel analog output card for the PCI bus, and each analog output channel is equipped with a 16-bit, double-buffered DAC. It also features an auto-calibration function and a BoardID™ switch.. The PCI-1723 is an ideal solution for industrial applications where multiple analog output channels are required.

### Specifications

#### Analog Output

- **Output Channels** 8
- **Resolution** 16-bit
- **Operation Mode** Single output, Synchronized output
- **Output Range** -10 ~ +10 V, 0 ~ 20 mA, 4 ~ 20 mA (Internal Reference only)
- **Accuracy** Relative  $\pm 6$  LSB  
Differential Non-linearity  $\pm 6$  LSB (monotonic)
- **Offset** < 6 LSB
- **Output Impedance** 0.1  $\Omega$  max.
- **Throughput** PC dependent, Software update (direct AO)
- **Settling time** 50  $\mu$ s (to  $\pm 6$  LSB of FSR)

#### Digital Input/Output

- **Channels** 16 (bi-directional)
- **Number of Ports** 2
- **Input Voltage** Low 0.8 V max.  
High 2.0 V min.
- **Output Voltage** Low 0.5 V max. @ 24 mA (sink)  
High 2.4 V min. @ -15 mA (source)

#### General

- **I/O Connector Type** 68-pin SCSI-II female
- **Dimensions** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical +5 V @ 850 mA, +12 V @ 600 mA  
Max. +5 V @ 1 A, +12 V @ 700 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (IEC 68-2-1,2)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Relative Humidity** 5 ~ 95 % RH non-condensing (IEC 68-2-3)
- **Certifications** CE

### Ordering Information

- **PCI-1723** 16-bit, 8-ch Non-isolated Analog Output Card
- **PCL-10168** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2m
- **ADAM-3968** 68-pin SCSI-II Wiring Terminal Board for DIN-rail mounting

### Applications

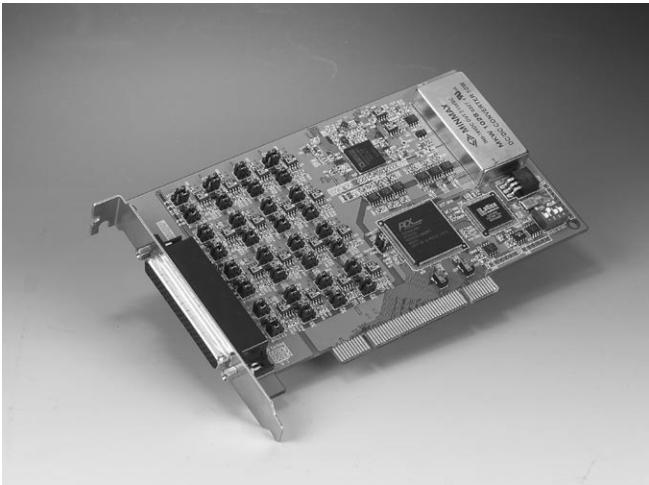
- Process control, Programmable voltage source, Programmable current sink, Servo control, Multiple loop PID control, V-command motion control

### Pin Assignments

NC	68	34	NC
Vout0	67	33	Vout1
AGND	66	32	AGND
Iout0	65	31	Iout1
NC	64	30	NC
AGND	63	29	AGND
Vout2	62	28	Vout3
AGND	61	27	AGND
Iout2	60	26	Iout3
NC	59	25	NC
AGND	58	24	AGND
Vout4	57	23	Vout5
AGND	56	22	AGND
Iout4	55	21	Iout5
NC	54	20	NC
AGND	53	19	AGND
Vout6	52	18	Vout7
AGND	51	17	AGND
Iout6	50	16	Iout7
NC	49	15	NC
AGND	48	14	AGND
DIO0	47	13	DIO1
DIO2	46	12	DIO3
DIO4	45	11	DIO5
DIO6	44	10	DIO7
DIO8	43	9	DIO9
DIO10	42	8	DIO11
DIO12	41	7	DIO13
DIO14	40	6	DIO15
DGND	39	5	DGND
NC	38	4	NC
NC	37	3	NC
NC	36	2	NC
+12V	35	1	+5V

# PCI-1724U

## 14-bit, 32-ch Isolated Analog Output Card



FCC CE

### Features

- High-density 32-channel analog output channels
- Flexible Output Range: +/-10 V, 0 ~ 20 mA and 4 ~ 20 mA
- Synchronized output function
- Keeps output values after system hot reset
- BoardID™ switch

### Introduction

The PCI-1724U is an isolated high-density multiple channel analog output card for the PCI bus, where each analog output channel is equipped with a 14-bit DAC. It features optional voltages, current output and a BoardID™ switch. The PCI-1724U is an ideal solution for industrial applications where multiple analog output channels are required.

### Specifications

#### Analog Output

- **Channels** 32 ch isolation
- **Resolution** 14-bit
- **Operation Mode** Single output, synchronized output
- **Output Range** -10 ~ +10 V, 0 ~ 20 mA, 4 ~ 20 mA (Internal Reference only)
- **Accuracy** Relative +/- 4 LSB  
Differential Non-linearity +/- 2 LSB (monotonic)

- **Offset** < 2 LSB
- **Output Impedance** 0.1  $\Omega$  max.
- **Throughput** PC dependent, Software update (Direct AO)
- **Settling Time** 60  $\mu$ s
- **Isolation** 1,500 V<sub>DC</sub> system isolation

#### General

- **I/O Connector Type** One 62-pin D-type connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95 % RH non-condensing (refer to IEC 68-2-3)

### Ordering Information

- **PCI-1724U** 14-bit, 32-ch Isolated Analog Output Card
- **PCI-10162** DB62 Cable Assembly (1m, 3m)
- **ADAM-3962** DB62 Cable Wiring Terminal for Din-Rail Mounting

### Applications

- Process control
- Programmable voltage source
- Programmable current sink
- Servo control
- Multiple loop PID control
- V-command motion control

### Pin Assignments

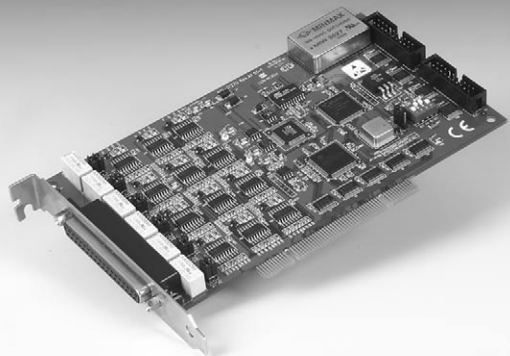
AGND	AGND	1	22	43	AGND
AO8	AGND	2	23	44	AO16
AGND	AO0	3	24	45	AGND
AO9	AGND	4	25	46	AO17
AGND	AO1	5	26	47	AGND
AO10	AGND	6	27	48	AO18
AGND	AO2	7	28	49	AGND
AO11	AGND	8	29	50	AO19
AGND	AO3	9	30	51	AGND
AO12	AGND	10	31	52	AO20
AGND	AO4	11	32	53	AGND
AO13	AGND	12	33	54	AO21
AGND	AO5	13	34	55	AGND
AO14	AGND	14	35	56	AO22
AGND	AO6	15	36	57	AGND
AO15	AGND	16	37	58	AO23
AGND	AO7	17	38	59	AO28
AGND	AO24	18	39	60	AO29
AGND	AO25	19	40	61	AO30
AGND	AO26	20	41	62	AO31
NC	AO27	21	42		
	NC				

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

# PCI-1727U

## 12-channel D/A output Card (ISA Compatible)

**NEW**



CE

### Features

- Compatible with PCL-727
- 12 independent analog output channels
- Multiple output range, including 4~20mA current loop
- 16 DI and 16 DO channels
- Fuse on each channel
- Universal PCI and BoardID™ switch

### Introduction

The PCI-1727U provides twelve 14-bit analog output channels, and is pin-compatible with the ISA PCL-727 card. It supports both +/-10V and 0~20mA current loop (sink). The card's on board DC-to-DC converter ensures the full 10V D/A output is always available.

Each analog output channel has a built-in fuse to protect the circuit, PC and the external devices. The PCI-1727U is an ideal, economical solution for the applications which require multiple PID control loops.

In addition to its analog outputs, the PCI-1727U provides 16 TTL DI and 16 TTL DO channels that are easily applied with industrial on/off control applications.

### Specifications

#### Analog Output

- **Chipset** ADI AD5390
- **Channels** 12
- **Resolution** 14 bits
- **Output Range**  $\pm 10$  V, 0 ~ 20 mA.
- **Current Loop Excitation Voltage** 8 V ~ 36 V
- **Output Current in Voltage Output** 15 mA max.
- **Throughput** Software Static Update
- **Setting Time**  $\leq 70$   $\mu$ s
- **Power on Default Value** All output ranges will output 0V or 0mA in power on
- **Fuse on Each Channel** 0.1A
- **Calibration Function**

#### Digital Input

- **Channels** 16
- **Level** TTL compatible
- **Logic0** 0.8 V max
- **Logic1** 2.0 V min
- **Input loading** 0.5 V @ 0.4 mA max. (low)  
2.7 V @ 50  $\mu$ A max (high)

#### Digital Output

- **Channels** 16
- **Level** TTL compatible
- **Logic0** 0.5 V @ 8 mA (sink)
- **Logic1** 2.4 V @ 0.4 mA (source)

#### Power Supply

- **+5V** 250 mA typical, 500 mA max
- **+12V** 150 mA typical, 300 mA max
- **-12V** 100 mA typical, 130 mA max

#### General

- **Connector** 37-pin D-type female
- **Dimensions** 175 × 100 mm (6.9" × 3.9")
- **Operating Temperature** 0 ~ 50 °C
- **Storage temperature** -20 ~ 65 °C
- **Relative Humidity** 5 ~ 95%, non-condensing

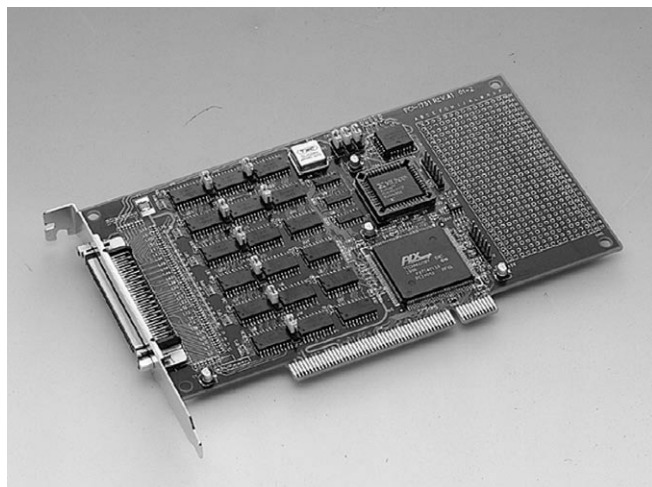
### Ordering Information

- **PCI-1727U** 12-channel D/A output Card
- **PCL-10120-1** 20-pin flat cable, 1m
- **PCL-10137-1** DB37 cable assembly, 1m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting
- **PCLD-780** Two 20-pin screw terminal board
- **PCLD-782** Opto-isolated D/I board
- **PCLD-785** Relay output board

# PCI-1751 PCI-1751U

## 48-bit Digital I/O Card and Counter Card

## 48-bit Universal Digital I/O and Counter Card



CE

### Features

- 48 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than 8255
- Interrupt handling
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- Universal PCI & BoardID switch (PCI-1751U only)

### Introduction

PCI-1751 is a 48-bit digital I/O card for the PCI bus. Its 48 bits are divided into six 8-bit I/O ports and users can configure each port as input or output via software. The PCI-1751 also provides one event counter and two 16-bit timers, which can be cascaded to become a 32-bit timer.

#### Fulfilling the True Requirements of Industrial Applications

With two practical functions, the PCI-1751 fulfills the true requirements of industrial applications. When the system is hot reset, (power is not shut off), the PCI-1751 can either retain the last I/O port setting and output value, or reset to its default configuration, depending on jumper settings. This function protects the system from wrong operations during unexpected system resets. Additionally, the PCI-1751 supports both dry and wet contacts so that it can easily interface with other devices.

#### Interrupt Handling Capability

Two lines in each I/O port (C0 and C4) and two of the three counter outputs (Timer 1 and Counter 2) are connected to the interrupt circuitry. Two interrupt request signals can be generated at the same time and the software can service the two request signals by ISR. Moreover, a pin in the connector can output a digital signal simultaneously with the card generating an interrupt, and users can utilize this function to trigger external devices with the interrupt.

### Specifications

- **I/O Channels** 48 digital I/O lines
- **Programming Mode** 8255 PPI mode 0
- **Digital Output**
  - **Logic Level 0** 0.4 V max. @ 24 mA (sink)
  - **Logic Level 1** 2.4 V min. @ 15 mA (source)
- **Digital Input**
  - **Logic Level 0** 0 ~ 0.8 V
  - **Logic Level 1** 2 ~ 5.25 V
- **Programmable timer/counter**
  - **Frequency Range** 0 ~ 10 MHz
  - **Counters** Two 16-bit counters or one 32-bit counter  
One 16-bit event counter
- **General**
  - **Power Consumption** 5 V @ 850 mA (typical)  
5 V @ 1.0 A (max.)
  - **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
  - **Storage Temperature** -20 ~ 80° C (-4 ~ 176° F)
  - **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
  - **Connectors** 68-pin SCSI-II female connector (Centronics type)
  - **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")

### Applications

- Industrial AC/DC I/O monitoring and controlling
- Relay and switch monitoring and controlling
- Parallel data transfer
- TTL, DTL and CMOS logic signal sensing
- Indicator LED driving

### Ordering Information

- **PCI-1751** 48-bit digital I/O card and Counter Card, user's manual and driver CD-ROM. (cable not included)
- **PCI-1751U** 48-bit universal digital I/O card and Counter Card, user's manual and driver CD-ROM. (cable not included)
- **PCL-10168** 68-pin SCSI cable, 1 and 2m
- **ADAM-3968** 68-pin SCSI cable wiring terminal for DIN-rail mounting
- **ADAM-3968/20** 68-pin SCSI-II to three 20-pin Wiring Terminal Module for DIN-Rail Mounting
- **ADAM-3968/50** 68-pin SCSI to 2 x 50-pin box headers converter module
- **PCLD-8751** 48-ch Isolated DI Board
- **PCLD-8761** 24-ch Replay and 24-IDI Board

### Pin Assignments

PA00	1	35	PA10
PA01	2	36	PA11
PA02	3	37	PA12
PA03	4	38	PA13
PA04	5	39	PA14
PA05	6	40	PA15
PA06	7	41	PA16
PA07	8	42	PA17
GND	9	43	GND
PB00	10	44	PB10
PB01	11	45	PB11
PB02	12	46	PB12
PB03	13	47	PB13
PB04	14	48	PB14
PB05	15	49	PB15
PB06	16	50	PB16
PB07	17	51	PB17
GND	18	52	GND
PC00	19	53	PC10
PC01	20	54	PC11
PC02	21	55	PC12
PC03	22	56	PC13
PC04	23	57	PC14
PC05	24	58	PC15
PC06	25	59	PC16
PC07	26	60	PC17
GND	27	61	GND
CNT0_OUT	28	62	CNT0_CLK
GND	29	63	CNT0_C
CNT1_OUT	30	64	CNT1_CLK
GND	31	65	CNT1_C
CNT2_OUT	32	66	CNT2_CLK
INT_OUT	33	67	CNT2_C
VCC	34	68	VCC

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Software

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IPPC

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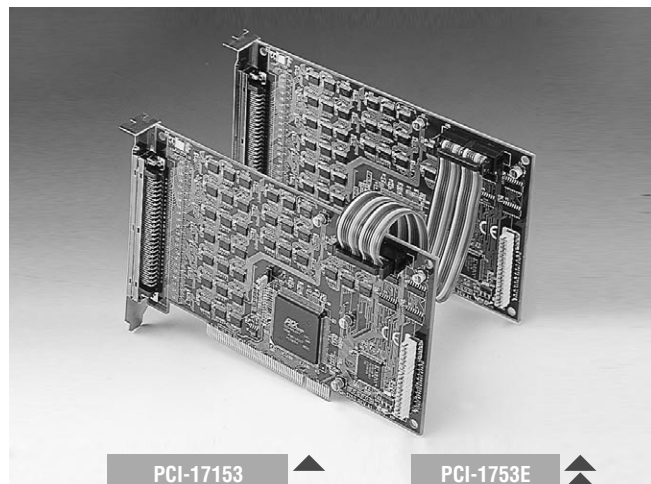
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# PCI-1753 PCI-1753E

## 96-ch Digital I/O Card

## 96-ch Digital I/O Extension Card for PCI-1753



### Features

- Up to 192 (96+96) TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than 8255
- Multiple-source interrupt handling
- Interrupt output pin for simultaneously triggering external devices with the interrupt
- Output status read-back
- "Pattern match" and "Change of state" interrupt functions for critical I/O monitoring
- Keeps I/O setting and digital output values when hot system reset
- Supports dry contact and wet contact
- High-density 100-pin SCSI connector

### Introduction

PCI-1753 is a 96-bit digital I/O card for the PCI bus, which can be extended to 192 digital I/O channels by connecting with its extension board, PCI-1753E. The card emulates mode 0 of the 8255 PPI chip, but the buffered circuits offer a higher driving capability than the 8255. The 96 I/O lines are divided into twelve 8-bit I/O ports: A0, B0, C0, A1, B1, C1, A2, B2, C2, A3, B3 and C3. You can configure each port as input or output via software.

### Specifications

- I/O Channels** 96 digital I/O lines for PCI-1753  
192 digital I/O lines if extending with PCI-1753E
- Programming Mode** 8255 PPI mode 0
- Input Signal** logic level 0: 0.8 V max.  
logic level 1: 2.0 V min.
- Output Signal** logic level 0: 0.44 V max. @ 24 mA (sink)  
logic level 1: 3.76 V min. @ 24 mA (source)
- Power Consumption** +5 V @ 400 mA (typical)  
+5 V @ 2.7 A (max.)
- Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- Storage Temperature** -20 ~ 70° C (-4 ~ 158° F) (refer to IEC 68-2-3)
- Operating Humidity** 5 ~ 95% RH non-condensing
- Connector** One 100-pin SCSI female connector (Centronics™ type)
- Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")

### Ordering Information

- PCI-1753** 96 ch. Digital I/O Card, user's manual and driver CD-ROM. (cable not included)
- PCI-1753E** Extension Board for PCI-1753
- PCL-10268** 100-pin to 2x68-pin SCSI cable, 1 and 2m (PCL-10268 100-pin SCSI-II male connector P/N: 16549A0000)
- ADAM-3968** 68-pin SCSI wiring terminal for DIN-rail mounting
- ADAM-3968/20** 68-pin SCSI-II to Three 20-pin Wiring Terminal Module for DIN-Rail Mounting
- ADAM-3968/50** 68-pin SCSI wiring terminal for DIN-rail mounting
- PCLD-8751** 48-ch Isolated DI Board
- PCLD-8761** 24-ch Replay and 24-IDI Board

### Applications

- Industrial AC/DC I/O devices for monitoring and controlling
- Relay and switch monitoring and controlling
- Parallel data transfer
- TTL, DTL and CMOS logic signal sensing
- Indicator LED driving

### Pin Assignments

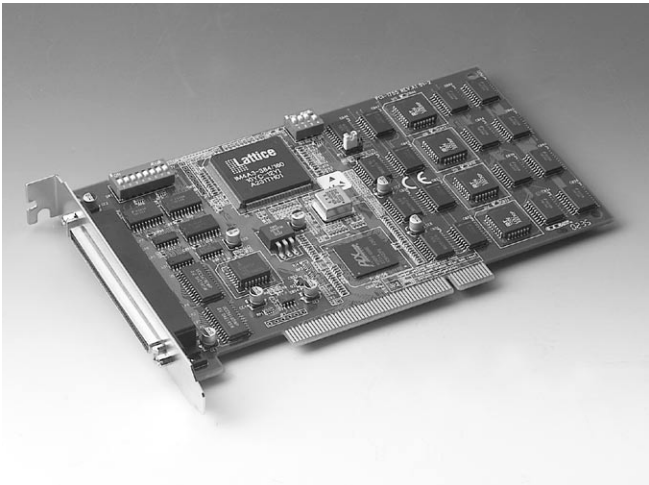
PA00	1	51	PA20
PA01	2	52	PA21
PA02	3	53	PA22
PA03	4	54	PA23
PA04	5	55	PA24
PA05	6	56	PA25
PA06	7	57	PA26
PA07	8	58	PA27
PB00	9	59	PB20
PB01	10	60	PB21
PB02	11	61	PB22
PB03	12	62	PB23
PB04	13	63	PB24
PB05	14	64	PB25
PB06	15	65	PB26
PB07	16	66	PB27
PC00	17	67	PC20
PC01	18	68	PC21
PC02	19	69	PC22
PC03	20	70	PC23
PC04	21	71	PC24
PC05	22	72	PC25
PC06	23	73	PC26
PC07	24	74	PC27
GND	25	75	GND
PA10	26	76	PA30
PA11	27	77	PA31
PA12	28	78	PA32
PA13	29	79	PA33
PA14	30	80	PA34
PA15	31	81	PA35
PA16	32	82	PA36
PA17	33	83	PA37
PB10	34	84	PB30
PB11	35	85	PB31
PB12	36	86	PB32
PB13	37	87	PB33
PB14	38	88	PB34
PB15	39	89	PB35
PB16	40	90	PB36
PB17	41	91	PB37
PC10	42	92	PC30
PC11	43	93	PC31
PC12	44	94	PC32
PC13	45	95	PC33
PC14	46	96	PC34
PC15	47	97	PC35
PC16	48	98	PC36
PC17	49	99	PC37
VCC	50	100	VCC

PA00 ~PA07: I/O pins of Port A0  
PA10 ~PA17: I/O pins of Port A1  
PA20 ~PA27: I/O pins of Port A2  
PA30 ~PA37: I/O pins of Port A3  
PB00 ~PB07: I/O pins of Port B0  
PB10 ~PB17: I/O pins of Port B1  
PB20 ~PB27: I/O pins of Port B2  
PB30 ~PB37: I/O pins of Port B3  
PC00 ~PC07: I/O pins of Port C0  
PC10 ~PC17: I/O pins of Port C1  
PC20 ~PC27: I/O pins of Port C2  
PC30 ~PC37: I/O pins of Port C3  
GND: Ground  
VCC: +5V voltage output



# PCI-1755

## Ultra-Speed 32-ch Digital I/O Card



FCC CE

### Features

- Bus-mastering DMA data transfer with scatter gather technology
- 32/16/8-bit Pattern I/O with start and stop trigger function, 2 modes Handshaking I/O Interrupt handling capability
- On-board active terminators for high speed and long distance transfer
- Pattern match and Change state detection interrupt function
- General-purpose 8-ch DI/O

### Introduction

The PCI-1755 supports PCI-bus mastering DMA for high-speed data transfer. By setting aside a block of memory in the PC, the PCI-1755 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

### Specifications

Channels	32 TTL compatible		
Number of Ports	Port A, Port B, Port C and Port D (8 bits/port)		
I/O Configuration	32DI (PA-PD) (default); 32DO (PA-PD); 16DI (PA-PB) & 16DO (PC-PD); 8DI (PA) & 8DO (PC) (Programmable)		
On-board FIFO	16 KB for DI & 16 KB DO channels		
Transfer Characteristics	Data Transfer Mode	Bus Mastering DMA with Scatter-Gather	
	Data Transfer Bus Width	8/16/32 bits (programmable)	
	Max. Transfer Rate	DI: 80 M bytes/sec, 32-bit @ 20 MHz 120 M bytes/sec, 32-bit @ 40 MHz external pacer when data length is less than FIFO size DO: 80 Mbytes/sec, 32-bit @ 20 MHz	
	Operation Mode	Handshaking	
Handshaking Mode	Direction	I/O	Samples No. Finite transfer, Continuous I/O
	Asynchronous	8255 Emulation	Synchronous Burst Handshaking
	Clock source for Burst Handshaking	Internal: 30 MHz, 20 MHz, 15 MHz, 12 MHz, 10 MHz, Timer#0 for DI & Timer#1 for DO External: EXT_CLKIN for DI & EXT_CLKOUT for DO	
Normal Mode	Input	Data Acquisition at a predetermined rate by internal/external clock	
	Output	Waveform Generation at a predetermined rate by internal/external clock	
	Clock Source for DI	Internal: 30 MHz, 20 MHz, 15 MHz, 12 MHz, 10 MHz, Timer#0 External: EXT_CLKIN	
	Clock Source for DO	Internal: 30 MHz, 20 MHz, 15 MHz, 12 MHz, 10 MHz, Timer#1 External: EXT_CLKOUT	
	Start Mode	Software command/Trigger signal occurred from DI_STR or DO_STR/Pattern DI	
Chang Detection (DI only)	Stop Mode	Software command/Trigger signal occurred from DI_STR (for DI) or DO_STR (for DO)/Pattern DI/Finite transfers	
	Monitor the selected input channel and capture data whenever there is a transition on one of the channels, and then issue a IRQ		
	Clock Source for DI	Internal: 30 MHz, 20 MHz, 15 MHz, 12 MHz, 10 MHz, Timer#0 External: EXT_CLKIN	
	Start Mode	Software command/Trigger signal occurred from DI_STR/Pattern DI	
Trigger Capability	Stop Mode	Software command/Trigger signal occurred from DI_STR/Pattern DI/Finite transfers	
	DI trigger signal	DI_STR, DI_STP	DO trigger signal DO_STR, DO_STP
	Low	0.8 V max.	High 2.0 V min.
	Trigger Type	Rising or falling edge, or digital pattern (for DI only)	
	Pulse width for edge triggers	10 ns min.	
Terminator	Pattern trigger detection capabilities	Detect pattern match or mismatch on user-selected data lines	
	On-board Schottky diode termination		

Messaging	The messages can be generated when1. A specified number of bytes have been transferred, 2. When a specified input pattern is matched, 3. When a measurement operation completes.				
Input Voltage	Low	0 V min.; 0.8 V max.	High	2.0 V min.; 5 V max.	
Input Load	Terminator OFF: TTL compatible				
	Low	+0.5 V @ ±20 mA		High	+2.7 V @ ±1 mA max.
	Terminator ON				
	Terminator Resistor	110 Ω	Termination Voltage	2.9 V	
	Low	+0.5 V @ ±22.4 mA	High	+2.7 V @ ±1 mA max.	
Output Voltage	Low	0.5 V max.	High	2.7 V min.	
Driving Capacity	Low	0.5 V max @ +48 mA (sink)	High	2.4 V min. @ -15 mA (source)	
Hysteresis	500 mV	Power Available at I/O connector	+4.65 ~ +5.25 V <sub>DC</sub> @ 1A		
General-purpose DI/O	DI Channels	DIO ~ DI7 (TTL compatible)			
	DO Channels	D00 ~ D07 (TTL compatible)			
Interrupt Source	DIO-7 and Timer#2, Pattern match and Change detection, DI FIFO overflow and DO FIFO underflow, DI_STP and DO_STP				

### Pacer

- Channels Timer#0, Timer#1 and Timer#2
- Timer#0 Timer pacer for digital input
- Timer#1 Timer pacer for digital output
- Timer#2 Interrupt source
- Resolution 16-bit
- Base Clock 10 MHz

### General

I/O Connector Type	100-pin SCSI-II female			
Dimensions (L x H)	175 x 100 mm (6.9" x 3.9")			
Power Consumption	Typical	Terminator OFF: +5 V @ 1 A Terminator ON: +5 V @ 1 A	Max.	Terminator OFF: +5 V @ 1 A Terminator ON: +5 V @ 1 A
	Operating	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1,2)	Storage	-20 ~ 85° C (-4 ~ 185° F)
Relative Humidity	5 ~ 95% RH non-condensing (refer to IEC 68-2-3)		Cert.	FCC, CE certified

### Ordering Information

- PCI-1755 Ultra-speed 32-ch Digital I/O Card
- ADAM-39100 PCI-1755 Wiring Terminal for DIN-rail Mounting
- PCL-101100-1 100-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 m

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

9  
Motion Control

10  
ICOM

11  
eConnectivity

12  
UNO

13  
ADAM-4000

14  
ADAM-5000

15  
ADAM-6000

16  
ADAM-8000

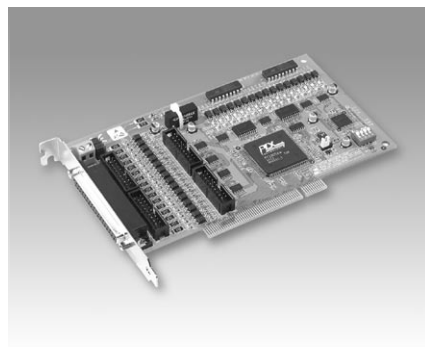
17  
BAS

# PCI-1730 PCI-1733 PCI-1734

## 32-ch Isolated Digital I/O Card (ISA Compatible)

## 32-ch Isolated Digital Input Card (ISA Compatible)

## 32-ch Isolated Digital Output Card (ISA Compatible)



PCI-1730



### Features

- 32 isolated DIO ch. (16 inputs and 16 outputs)
- 32 TTL-level DIO ch. (16 inputs and 16 outputs)
- High output driving capacity
- Interrupt capability
- Two 20-pin connectors for isolated digital I/O channels and two for TTL digital I/O channels
- D-type connector for isolated input and output ch.

### Specifications

#### Isolated Digital Input

- Input Channels** 16 (16-ch/group)
- Interrupt Inputs** 4 (IDIO, IDI1, DIO, DI1)
- Interrupt Levels** 2 - 7
- Input Voltage** 5 ~ 30 V<sub>DC</sub>
- Input Resistance** 2.7 kΩ @ 1 W
- Optical Isolation** 2,500 V<sub>DC</sub>
- Throughput** 10 kHz max.

#### Isolated Digital Output

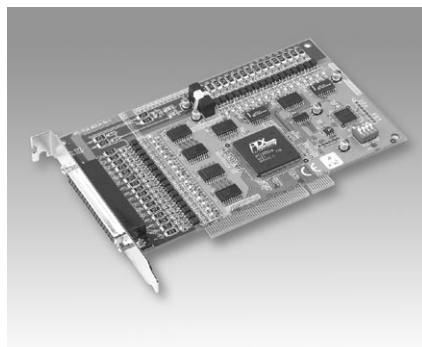
- Output Channels** 16 (16-ch/group)
- Optical Isolation** 2,500 V<sub>DC</sub>
- Throughput** 10 kHz
- Supply Voltage** 5 ~ 40 V<sub>DC</sub>
- Sink Current** 200 mA max./channel

#### General

- I/O Connector Type** 37-pin D-type female
- Dimensions (L x H)** 185 x 100 mm (7.3"x3.9")
- Power Consumption** Typical: +5 V @ 330 mA  
Max: +5 V @ 500 mA
- Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- Storage Temperature** -20~70°C (-4~158°F)
- Relative Humidity** 5 ~ 95% (IEC 68-2-3) non-condensing

### Ordering Information

- PCI-1730** Card, manual and driver CD-ROM (cable not included.)



PCI-1733



### Features

- 32 isolated, bidirectional digital input channels
- High-voltage isolation (2,500 V<sub>DC</sub>)
- Interrupt capacity
- D-type connectors for isolated input channels
- Reverse voltage protection for isolated input channels (up to 24 V<sub>DC</sub>)

### Specifications

#### Isolated Digital Input

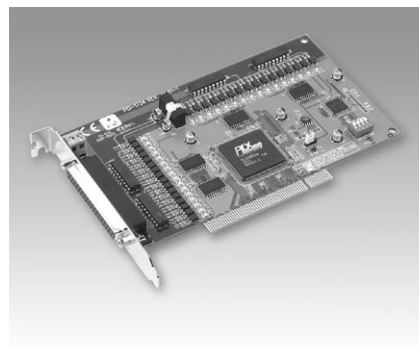
- Input Channels** 32 (16-ch/group)
- Interrupt Inputs** 4 (IDIO, IDI1, IDI16, IDI17)
- Interrupt Levels** 2, 3, 5, 7, 10, 11, 12, 15
- Input Voltage** 5 ~ 30 V<sub>DC</sub>
- Input Resistance** 5 ~ 30 V<sub>DC</sub>
- Input Resistance** 2.7 kΩ @ 1 W
- Optical Isolation** 2,500 V<sub>DC</sub>
- Throughput** 10 kHz max.

#### General

- I/O Connector Type** 37-pin D-type female
- Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- Power Consumption** Typical: +5 V @ 320 mA  
Max: +5 V @ 500 mA
- Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- Storage Temperature** -20~70°C (-4~158°F)
- Relative Humidity** 5 ~ 95% (IEC 68-2-3) non-condensing

### Ordering Information

- PCI-1733** 32-channel isolated digital input card, manual and driver CD-ROM (cable not included)



PCI-1734



### Features

- 32 isolated digital output channels
- High output driving capacity
- High-voltage isolation on output channels (2,500 V<sub>DC</sub>)
- High sink current on isolated output channels (200 mA/channel)
- Integral suppression diodes for inductive loads
- Wide output range (5 ~ 40 V<sub>DC</sub>)
- D-type connectors for isolated output channels

### Specifications

#### Isolated Digital Output

- Output Channels** 32 (16-ch/group)
- Optical Isolation** 2,500 V<sub>DC</sub>
- Throughput** 10 kHz
- Supply Voltage** 5 ~ 40 V<sub>DC</sub>
- Sink Current** 200 mA max./channel

#### General

- I/O Connector Type** 37-pin D-type female
- Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- Power Consumption** Typical: +5 V @ 330 mA  
Max: +5 V @ 500 mA
- Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- Storage Temperature** -20~70°C (-4~158°F)
- Relative Humidity** 5 ~ 95% (IEC 68-2-3) non-condensing

### Ordering Information

- PCI-1734** 32-channel Isolated digital output card, user's manual and driver CD-ROM (cable not included)

PCI-1730  
PCI-1733  
PCI-1734

1	Software
2	IPPC
3	TPC
4	FPM
5	ATM & AWS
6	DA&C
7	cPCI
8	ADAM-3000
9	Motion Control
10	ICOM
11	eConnectivity
12	UNO
13	ADAM-4000
14	ADAM-5000
15	ADAM-6000
16	ADAM-8000
17	BAS

PCI-1730 Accessories

- **PCL-10120-1** 20-pin flat cable, 1m
- **PCL-10120-2** 20-pin flat cable, 2m
- **PCLD-782** 16-channel opto-isolated D/I board
- **ADAM-3920** 20-pin flat cable wiring terminal for DIN-rail mounting
- **PCLD-885** 16-channel power relay (form A) output board
- **PCLD-785** 16-channel relay output board
- **PCLD-786** 8-channel SSR I/O module carrier board

General Accessories

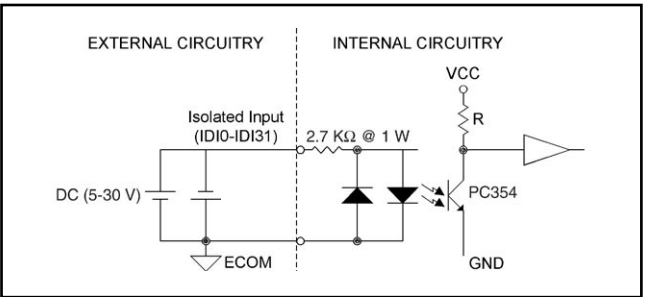
- **PCLD-780** Universal screw terminal board
- **PCLD-880** Universal screw terminal board
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting
- **PCL-10137-1** DB37 cable, 1m
- **PCL-10137-2** DB37 cable, 2m
- **PCL-10137-3** DB37 cable, 3m

Introduction

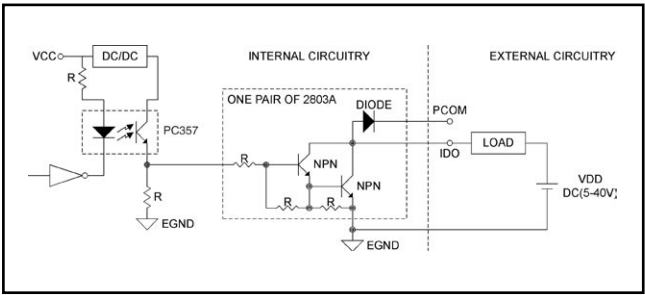
The PCI-1730/1733/1734 cards offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V<sub>DC</sub>, which makes them ideal for industrial applications where high-voltage isolation is required. In addition, all output channels are provided with high-voltage protection.

Applications

- Industrial on/off control
- Contact closure monitoring
- Switch status sensing
- BCD interfacing
- Digital input control
- Industrial and lab automation



Isolated Input Circuit Diagram



Isolated Output Circuit Diagram

Pin Assignments

CN1 of PCI-1730				CN2 of PCI-1730			
IDO 0	1	2	IDO 1	IDI 0	1	2	IDI 1
IDO 2	3	4	IDO 3	IDI 2	3	4	IDI 3
IDO 4	5	6	IDO 5	IDI 4	5	6	IDI 5
IDO 6	7	8	IDO 7	IDI 6	7	8	IDI 7
IDO 8	9	10	IDO 9	IDI 8	9	10	IDI 9
IDO 10	11	12	IDO 11	IDI 10	11	12	IDI 11
IDO 12	13	14	IDO 13	IDI 12	13	14	IDI 13
IDO 14	15	16	IDO 15	IDI 14	15	16	IDI 15
EGND	17	18	EGND	ECOM0	17	18	ECOM1
PCOM0/EGND	19	20	PCOM1	ECOM0	19	20	ECOM1

CN3 of PCI-1730				CN4 of PCI-1730			
DO 0	1	2	DO 1	DI 0	1	2	DI 1
DO 2	3	4	DO 3	DI 2	3	4	DI 3
DO 4	5	6	DO 5	DI 4	5	6	DI 5
DO 6	7	8	DO 7	DI 6	7	8	DI 7
DO 8	9	10	DO 9	DI 8	9	10	DI 9
DO 10	11	12	DO 11	DI 10	11	12	DI 11
DO 12	13	14	DO 13	DI 12	13	14	DI 13
DO 14	15	16	DO 15	DI 14	15	16	DI 15
GND	17	18	GND	GND	17	18	GND
+5V	19	20	+12V	+5V	19	20	+12V

CN6 of PCI-1730

IDIO	1	IDI1
IDI2	2	IDI3
IDI4	3	IDI5
IDI6	4	IDI7
IDI8	5	IDI9
IDI10	6	IDI11
IDI12	7	IDI13
IDI14	8	IDI15
ECOM0	9	ECOM1/EGND
IDO 0	10	EGND
IDO 2	11	IDO 1
IDO 4	12	IDO 3
IDO 6	13	IDO 5
IDO 8	14	IDO 7
IDO 10	15	IDO 9
IDO 12	16	IDO 11
IDO 14	17	IDO 13
PCOM1	18	IDO 15
	19	

**DO** Digital output  
**DI** Digital input  
**IDO** Isolated digital output  
**IDI** Isolated digital input  
**EGND** External ground for isolated output  
**ECOM** External common for isolated input  
**GND** Digital ground  
**PCOM** Free wheeling common diode

CN1 of PCI-1733

IDIO	1	IDI1
IDI2	2	IDI3
IDI4	3	IDI5
IDI6	4	IDI7
IDI8	5	IDI9
IDI10	6	IDI11
IDI12	7	IDI13
IDI14	8	IDI15
ECOM1	9	ECOM2
IDO 1	10	IDO 2
IDO 3	11	IDO 4
IDO 5	12	IDO 6
IDO 7	13	IDO 8
IDO 9	14	IDO 10
IDO 11	15	IDO 12
IDO 13	16	IDO 14
IDO 15	17	IDO 16
EGND	18	EGND
	19	

CN1 of PCI-1734

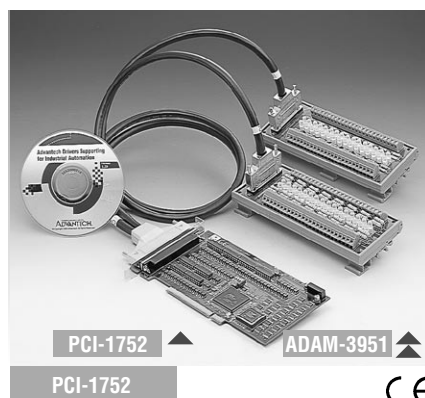
IDO0	1	IDO1
IDO2	2	IDO3
IDO4	3	IDO5
IDO6	4	IDO7
IDO8	5	IDO9
IDO10	6	IDO11
IDO12	7	IDO13
IDO14	8	IDO15
IDO16	9	IDO17
IDO18	10	IDO19
IDO20	11	IDO21
IDO22	12	IDO23
IDO24	13	IDO25
IDO26	14	IDO27
IDO28	15	IDO29
IDO30	16	IDO31
EGND	17	EGND
	18	
	19	

# PCI-1752 PCI-1754 PCI-1756

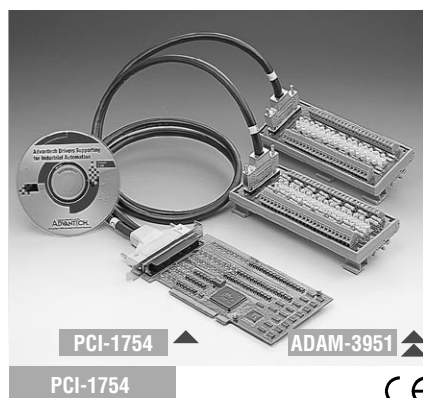
## 64-ch Isolated Digital Output Card

## 64-ch Isolated Digital Input Card

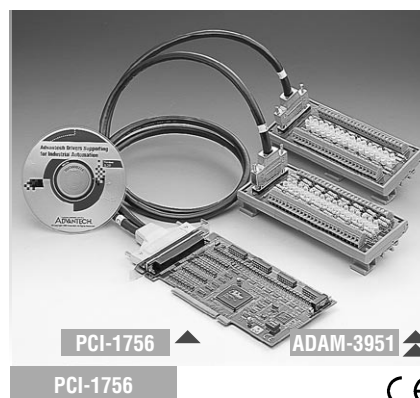
## 64-ch Isolated Digital I/O Card



PCI-1752



PCI-1754



PCI-1756

### Features

- 64 isolated digital output channels
- High-voltage isolation on output channels (2500 V<sub>DC</sub>)
- 2000 V<sub>DC</sub> ESD protection
- Wide output range (5 ~ 40 V<sub>DC</sub>)
- High-sink current on isolated output channels (200 mA max./channel)
- Output status read-back
- Keeps digital output values when hot system reset
- Channel-freeze function
- High-density 100-pin SCSI connector

### Specifications

#### General

- I/O Connector Type** 100-pin SCSI-II female
- Dimensions (L x H)** 175x100mm (6.9"x3.9")
- Power Consumption** Typical: +5 V @ 230 mA  
Max.: +5 V @ 500 mA
- Operating Temperature** 0~60° C (32 ~ 140° F)  
(IEC 68-2-1, 2)
- Storage Temperature** -20~70° C (-4 ~ 158° F)
- Relative Humidity** 5~95 % (IEC 68-2-3)  
non-condensing

#### Isolated Digital Output

- Output Channels** 64 (16-ch/group)
- Optical Isolation** 2,500 V<sub>DC</sub>
- Opto-isolator resp. time** 25 µs
- Supply Voltage** 5 ~ 40 V<sub>DC</sub>
- Sink Current** 200 mA max./channel

### Ordering Information

- PCI-1752** 64-channel Isolated Digital Output Card, user's manual and driver CD-ROM (cable not included)

### Features

- 64 isolated digital input channels
- Either +/- voltage input for DI by group
- High-voltage isolation on input channels (2500 V<sub>DC</sub>)
- High over-voltage protection (70 V<sub>DC</sub>)
- Wide input range (10 ~ 50 V<sub>DC</sub>)
- Interrupt handling capability
- High-density 100-pin SCSI connector

### Specifications

#### General

- I/O Connector Type** 100-pin SCSI-II female
- Dimensions (L x H)** 175x100mm (6.9"x3.9")
- Power Consumption** Typical: +5 V @ 340 mA  
Max.: +5 V @ 450 mA
- Operating Temperature** 0~60° C (32 ~ 140° F)  
(IEC 68-2-1, 2)
- Storage Temperature** -20~70° C (-4 ~ 158° F)
- Relative Humidity** 5~95 % (IEC 68-2-3)  
non-condensing

#### Isolated Digital Input

- Input Channels** 64 (16-ch/group)
- Interrupt Inputs** 4
- Optical Isolation** 2,500 V<sub>DC</sub>
- Opto-Isolator Resp. Time** 25 µs
- Over-Voltage Protection** 70 V<sub>DC</sub>
- ESD** 2,000 V<sub>DC</sub>
- Input Voltage** V<sub>IH</sub> (max.) 50 V<sub>DC</sub>  
V<sub>IH</sub> (min.) 10 V<sub>DC</sub>  
V<sub>IL</sub> (max.) 3 V<sub>DC</sub>
- Input Current** 10 V<sub>DC</sub> 1.7 mA (typical)  
12 V<sub>DC</sub> 2.1 mA (typical)  
24 V<sub>DC</sub> 4.4 mA (typical)  
48 V<sub>DC</sub> 9.0 mA (typical)  
50 V<sub>DC</sub> 9.4 mA (typical)

### Ordering Information

- PCI-1754** 64-channel Isolated Digital Input Card

### Features

- Either +/- voltage input for DI by group
- Output status read-back for output channels
- Keeps digital output values after hot system reset

### Specifications

#### General

- I/O Connector Type** 100-pin SCSI-II female
- Dimensions (L x H)** 175x100mm (6.9"x3.9")
- Power Consumption** Typical: +5 V @ 285 mA  
Max.: +5 V @ 475 mA
- Operating Temperature** 0~60° C (32 ~ 140° F)  
(IEC 68-2-1, 2)
- Storage Temperature** -20~70° C (-4 ~ 158° F)
- Relative Humidity** 5~95 % (IEC 68-2-3)  
non-condensing

#### Isolated Digital Output

- Output Channels** 32 (16-ch/group)
- Optical Isolation** 2,500 V<sub>DC</sub>
- Opto-Isolator Resp. Time** 25 µs
- Supply Voltage** 5 ~ 40 V<sub>DC</sub>
- Sink Current** 200 mA max./channel

#### Isolated Digital Input

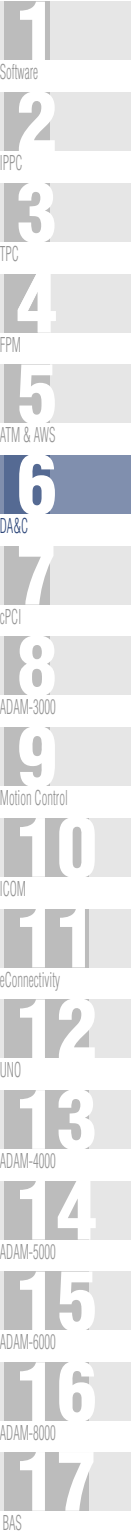
- Input Channels** 32 (16-ch/group)
- Interrupt Inputs** 2 (IDIO, IDI16)
- Optical Isolation** 2,500 V<sub>DC</sub>
- Opto-Isolator Resp. Time** 25 µs
- Over-Voltage Protection** 70 V<sub>DC</sub>
- ESD** 2,000 V<sub>DC</sub>
- Input Voltage** V<sub>IH</sub> (max.) 50 V<sub>DC</sub>  
V<sub>IH</sub> (min.) 10 V<sub>DC</sub>  
V<sub>IL</sub> (max.) 3 V<sub>DC</sub>
- Input Current** 10 V<sub>DC</sub> 1.7 mA (typical)  
12 V<sub>DC</sub> 2.1 mA (typical)  
24 V<sub>DC</sub> 4.4 mA (typical)  
48 V<sub>DC</sub> 9.0 mA (typical)  
50 V<sub>DC</sub> 9.4 mA (typical)

### Ordering Information

- PCI-1756** 64-channel Isolated Digital I/O Card



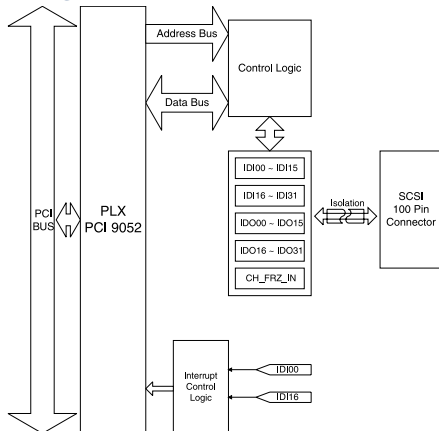
PCI-1752  
PCI-1754  
PCI-1756



Accessories

- PCL-10250 100-pin SCSI to two 50-pin SCSI cable, 1m
- PCL-10250-2 100-pin SCSI to two 50-pin SCSI cable, 2m
- ADAM-3951 Wiring terminal module with LED indicators for DIN-rail mounting
- ADAM-3950S 50-pin SCSI-II Wiring Terminal
- ADAM-3950D Dual 50-pin SCSI-II Wiring Terminal

Block Diagram (PCI-1756)



Pin Assignments

PCI-1752										PCI-1754										PCI-1756										
ID000	1	51	ID001	52	53	ID002	54	55	ID003	ID004	1	51	ID005	52	53	ID006	54	55	ID007	ID008	1	51	ID009	52	53	ID010	54	55	ID011	56
ID009	2	52	ID010	53	54	ID011	55	56	ID012	ID013	1	51	ID014	52	53	ID015	54	55	ID016	ID017	1	51	ID018	52	53	ID019	54	55	ID020	56
ID012	7	57	ID013	58	59	ID014	60	61	ID015	ID016	1	51	ID017	52	53	ID018	54	55	ID019	ID020	1	51	ID021	52	53	ID022	54	55	ID023	56
ID016	13	63	ID017	64	65	ID018	66	67	ID019	ID020	1	51	ID021	52	53	ID022	54	55	ID023	ID024	1	51	ID025	52	53	ID026	54	55	ID027	56
ID020	15	65	ID021	66	67	ID022	68	69	ID023	ID024	1	51	ID025	52	53	ID026	54	55	ID027	ID028	1	51	ID029	52	53	ID030	54	55	ID031	56
ID022	16	66	ID023	67	68	ID024	69	70	ID025	ID026	1	51	ID027	52	53	ID028	54	55	ID029	ID030	1	51	ID031	52	53	ID032	54	55	ID033	56
ID024	17	67	ID025	68	69	ID026	70	71	ID027	ID028	1	51	ID029	52	53	ID030	54	55	ID031	ID032	1	51	ID033	52	53	ID034	54	55	ID035	56
ID026	18	68	ID027	69	70	ID028	71	72	ID029	ID030	1	51	ID031	52	53	ID032	54	55	ID033	ID034	1	51	ID035	52	53	ID036	54	55	ID037	56
ID028	19	69	ID029	70	71	ID030	72	73	ID031	ID032	1	51	ID033	52	53	ID034	54	55	ID035	ID036	1	51	ID037	52	53	ID038	54	55	ID039	56
ID030	20	70	ID031	71	72	ID032	73	74	ID033	ID034	1	51	ID035	52	53	ID036	54	55	ID037	ID038	1	51	ID039	52	53	ID040	54	55	ID041	56
ID032	21	71	ID033	72	73	ID034	74	75	ID035	ID036	1	51	ID037	52	53	ID038	54	55	ID039	ID040	1	51	ID041	52	53	ID042	54	55	ID043	56
ID034	22	72	ID035	73	74	ID036	75	76	ID037	ID038	1	51	ID039	52	53	ID040	54	55	ID041	ID042	1	51	ID043	52	53	ID044	54	55	ID045	56
ID036	23	73	ID037	74	75	ID038	76	77	ID039	ID040	1	51	ID041	52	53	ID042	54	55	ID043	ID044	1	51	ID045	52	53	ID046	54	55	ID047	56
ID038	24	74	ID039	75	76	ID040	77	78	ID041	ID042	1	51	ID043	52	53	ID044	54	55	ID045	ID046	1	51	ID047	52	53	ID048	54	55	ID049	56
ID040	25	75	ID041	76	77	ID042	78	79	ID043	ID044	1	51	ID045	52	53	ID046	54	55	ID047	ID048	1	51	ID049	52	53	ID050	54	55	ID051	56
ID042	26	76	ID043	77	78	ID044	79	80	ID045	ID046	1	51	ID047	52	53	ID048	54	55	ID049	ID050	1	51	ID051	52	53	ID052	54	55	ID053	56
ID044	27	77	ID045	78	79	ID046	80	81	ID047	ID048	1	51	ID049	52	53	ID050	54	55	ID051	ID052	1	51	ID053	52	53	ID054	54	55	ID055	56
ID046	28	78	ID047	79	80	ID048	81	82	ID049	ID050	1	51	ID051	52	53	ID052	54	55	ID053	ID054	1	51	ID055	52	53	ID056	54	55	ID057	56
ID048	29	79	ID049	80	81	ID050	82	83	ID051	ID052	1	51	ID053	52	53	ID054	54	55	ID055	ID056	1	51	ID057	52	53	ID058	54	55	ID059	56
ID050	30	80	ID051	81	82	ID052	83	84	ID053	ID054	1	51	ID055	52	53	ID056	54	55	ID057	ID058	1	51	ID059	52	53	ID060	54	55	ID061	56
ID052	31	81	ID053	82	83	ID054	84	85	ID055	ID056	1	51	ID057	52	53	ID058	54	55	ID059	ID060	1	51	ID061	52	53	ID062	54	55	ID063	56
ID054	32	82	ID055	83	84	ID056	85	86	ID057	ID058	1	51	ID059	52	53	ID060	54	55	ID061	ID062	1	51	ID063	52	53	ID064	54	55	ID065	56
ID056	33	83	ID057	84	85	ID058	86	87	ID059	ID060	1	51	ID061	52	53	ID062	54	55	ID063	ID064	1	51	ID065	52	53	ID066	54	55	ID067	56
ID058	34	84	ID059	85	86	ID060	87	88	ID061	ID062	1	51	ID063	52	53	ID064	54	55	ID065	ID066	1	51	ID067	52	53	ID068	54	55	ID069	56
ID060	35	85	ID061	86	87	ID062	88	89	ID063	ID064	1	51	ID065	52	53	ID066	54	55	ID067	ID068	1	51	ID069	52	53	ID070	54	55	ID071	56
ID062	36	86	ID063	87	88	ID064	89	90	ID065	ID066	1	51	ID067	52	53	ID068	54	55	ID069	ID070	1	51	ID071	52	53	ID072	54	55	ID073	56
ID064	37	87	ID065	88	89	ID066	90	91	ID067	ID068	1	51	ID069	52	53	ID070	54	55	ID071	ID072	1	51	ID073	52	53	ID074	54	55	ID075	56
ID066	38	88	ID067	89	90	ID068	91	92	ID069	ID070	1	51	ID071	52	53	ID072	54	55	ID073	ID074	1	51	ID075	52	53	ID076	54	55	ID077	56
ID068	39	89	ID069	90	91	ID070	92	93	ID071	ID072	1	51	ID073	52	53	ID074	54	55	ID075	ID076	1	51	ID077	52	53	ID078	54	55	ID079	56
ID070	40	90	ID071	91	92	ID072	93	94	ID073	ID074	1	51	ID075	52	53	ID076	54	55	ID077	ID078	1	51	ID079	52	53	ID080	54	55	ID081	56
ID072	41	91	ID073	92	93	ID074	94	95	ID075	ID076	1	51	ID077	52	53	ID078	54	55	ID079	ID080	1	51	ID081	52	53	ID082	54	55	ID083	56
ID074	42	92	ID075	93	94	ID076	95	96	ID077	ID078	1	51	ID079	52	53	ID080	54	55	ID081	ID082	1	51	ID083	52	53	ID084	54	55	ID085	56
ID076	43	93	ID077	94	95	ID078	96	97	ID079	ID080	1	51	ID081	52	53	ID082	54	55	ID083	ID084	1	51	ID085	52	53	ID086	54	55	ID087	56
ID078	44	94	ID079	95	96	ID080	97	98	ID081	ID082	1	51	ID083	52	53	ID084	54	55	ID085	ID086	1	51	ID087	52	53	ID088	54	55	ID089	56
ID080	45	95	ID081	96	97	ID082	98	99	ID083	ID084	1	51	ID085	52	53	ID086	54	55	ID087	ID088	1	51	ID089	52	53	ID090	54	55	ID091	56
ID082	46	96	ID083	97	98	ID084	99	100	ID085	ID086	1	51	ID087	52	53	ID088	54	55	ID089	ID090	1	51	ID091	52	53	ID092	54	55	ID093	56
ID084	47	97	ID085	98	99	ID086	100	CH_FRZ_IN	ID087	ID088	1	51	ID089	52	53	ID090	54	55	ID091	ID092	1	51	ID093	52	53	ID094	54	55	ID095	56
ID086	48	98	ID087	99	100	CH_FRZ_IN	CH_FRZ_COM	NC	ID089	ID090	1	51	ID091	52	53	ID092	54	55	ID093	ID094	1	51	ID095	52	53	ID096	54	55	ID097	56
ID088	49	99	ID089	100	CH_FRZ_IN	CH_FRZ_COM	NC	NC	ID091	ID092	1	51	ID093	52	53	ID094	54	55	ID095	ID096	1	51	ID097	52	53	ID098	54	55	ID099	56
ID090	50	100	CH_FRZ_IN	CH_FRZ_COM	NC	NC	NC	NC	ID093	ID094	1	51	ID095	52	53	ID096	54	55	ID097	ID098	1	51	ID099	52	53	ID100	54	55	ID101	56

- ID000 ~ ID015 : Isolated digital output of Group 0  
ID016 ~ ID031 : Isolated digital output of Group 1  
ID032 ~ ID047 : Isolated digital output of Group 2  
ID048 ~ ID063 : Isolated digital output of Group 3  
PCOM0 : External common input of Group 0  
PCOM1 : External common input of Group 1  
PCOM2 : External common input of Group 2  
PCOM3 : External common input of Group 3  
IGND : Isolated ground  
CH\_FRZ\_IN : Channel-Freeze input pin  
CH\_FRZ\_COM : Common pin for Channel-Freeze input  
ID100 ~ ID115 : Isolated digital input of Group 0  
ID116 ~ ID131 : Isolated digital input of Group 1  
ID132 ~ ID147 : Isolated digital input of Group 2  
ID148 ~ ID163 : Isolated digital input of Group 3  
ECOM0 : External common input of Group 0  
ECOM1 : External common input of Group 1  
ECOM2 : External common input of Group 2  
ECOM3 : External common input of Group 3  
NC : No connection

Applications

- Industrial On/Off control
- Switch status sensing
- BCD interfacing
- Digital I/O control
- Industrial and lab automation
- SMT/PCB machinery
- Semi-conductor machinery
- PC-based Industrial Machinery
- Testing & Measurement
- Laboratory & Education

Feature Details

PCI-1752, PCI-1754 and PCI-1756 offer isolated digital input channels and isolated digital output channels with isolation protection up to 2,500 VDC. This makes them ideal for industrial applications where high-voltage isolation is required. In addition, all output channels are able to keep their last values after a hot system reset. Furthermore, the PCI-1752 and PCI-1756 provide a channel-freeze function that keeps the current output status unchanged for each channel during operation.

Robust Protection

PCI-1752, PCI-1754 and PCI-1756 feature robust isolation protection for applications in industrial, lab and machinery automation. It can durably withstand voltage up to 2,500 VDC, preventing your host system from any incidental harm. If connected to an external input source with surge-protection, PCI-1754 and 1756 can offer up to 2,000 V DC ESD (Electrostatic Discharge) protection for input channels. If the input voltage rises up to 70 V DC, the input channels of PCI-1754 and PCI-1756 can still manage to work properly for a short period of time.

Wide Input/Output Range

PCI-1754 and PCI-1756 have a wide range of input voltages from 10 to 50 V DC, and is therefore suitable for most industrial applications with 12 V DC, 24 V DC and 48 V DC input voltage. PCI-1752 and PCI-1756 feature a wide output voltage range from 5 to 40 V DC, suitable for most industrial applications with 12 V DC/24 V DC output voltages. In the meantime, you can also request specific input/output voltage ranges as products can be tailored to specifications.

BoardID™ Switch

PCI-1752, PCI-1754 and PCI-1756 have a built-in BoardID™ DIP switch that helps define each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

Channel-Freeze Function

PCI-1752 and PCI-1756 provide a Channel-Freeze function, which can be enabled either in dry contact or wet contact mode (selected by the on-board jumper). When the Channel-Freeze function is enabled, the last status of each digital output channel will be safely kept for emergency use. Moreover, you can enable this function through software as it is useful in software simulation and testing program.

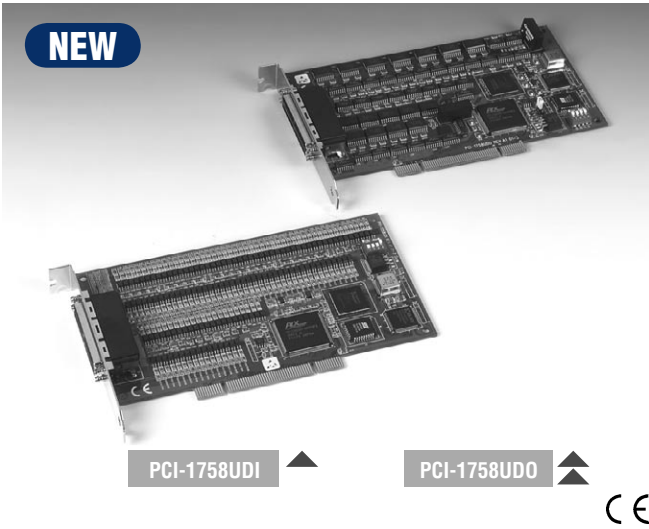
Reset Protection Fulfills Requirement for Industrial Applications

If the system has undergone a hot reset (i.e. without turning off the system power), PCI-1752 and PCI-1756 can either retain the output values of each channel or return to its default configuration as open status, depending on its on-board jumper setting. This function protects the system from performing wrong operations during unexpected system resets.



# PCI-1758U

## 128-ch Isolated Digital I/O Card



### Specifications

#### Isolated Digital Input

Model Name	PCI-1758UDI	
Input Channels	128	
Interrupt Input	128	
Optical Isolation	2,500 V <sub>DC</sub>	
Opto-Isolator Response Time	50 µs	
Input Voltage	VIH (max)	25V
	VIH (min)	5V
	VIL (max)	2.5V
Input Resistance	3 kΩ	

#### Isolated Digital Output

Model Name	PCI-1758UDO	
Output Channels	128	
Optical Isolation	2,500 V <sub>DC</sub>	
Opto-Isolator Response Time	50 µs	
Supply Voltage	5-40 V	
Sink Current	90 mA max./Channel	

#### General

Model Name	PCI-1758UDI	PCI-1758UDO
I/O Connector Type	MINI-SCSI HDRA-E100 Female	
Dimensions	175 x 100 mm (6.9" x 3.9")	
Power Consumption	Typical	+5 V @ 0.3 A    +5 V @ 1.1 A
	Max.	+5 V @ 0.6 A    +5 V @ 2.2 A
Temperature	Operating	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1,2)
	Storage	-20 ~ 70° C (-4 ~ 158° F)
Relative Humidity	5 ~ 95% RH non-condensing (refer to IEC 68-2-3)	

### Ordering Information

- **PCI-1758UDI**                    128-channel Isolated Digital Input Card
- **PCI-1758UDO**                128-channel Isolated Digital Output Card
- **PCL-101100S-1**            100-pin SCSI Cable, 1m
- **ADAM-39100**                100-pin SCSI wiring terminal, DIN-rail mounting

### Features

#### PCI-1758UDO card

- 128 isolated digital output channels
- High-voltage isolation on output channels (2,500 V<sub>DC</sub>)
- Wide output range (5 ~ 40 V<sub>DC</sub>)
- High-sink current for isolated output channels (90 mA max./Channel)
- Current protection for each port
- BoardID™ switch
- Output status read-back
- Digital output value retained after hot system reset
- Programmable Power-Up States
- Watchdog timer

#### PCI-1758UDI card

- 128 isolated digital input channels
- Wide input range (5 ~ 25 V<sub>DC</sub>)
- High ESD protection (2,000 V<sub>DC</sub>)
- Digital Filter function
- BoardID™ switch
- Interrupt handling capability for each channel (128-ch)

### Feature Details

#### Interrupt Function (PCI-1758UDI)

PCI-1758UDI provides an interrupt function for every digital input channel. All the isolated digital input channels are connected to the interrupt circuitry. You can disable/enable the interrupt functions, select trigger type by setting the Rising Edge Interrupt Registers and Falling Edge Interrupt Registers of PCI-1758UDI. When the interrupt request signals occur, software will service these interrupt requests by ISR. The multiple interrupt sources provide the card with more capability and flexibility.

#### Digital Filter Function (PCI-1758UDI)

The digital filter function is used to eliminate glitches on input data and reduce the number of changes to examine and process. The filter blocks pulses that are shorter than the specified timing interval and passes pulses that are twice as long as the specified interval. Intermediate-length pulses that are longer than half of the interval, but less than the interval, may or may not pass the filter.

#### Watchdog Timer Function (PCI-1758UDO)

This feature is used to set critical outputs to safe states in the event of a software failure. When the watch-dog timer is enabled, the PCI-1758UDO has to receive a "watchdog clear" software command within the interval time specified for the watchdog timer. If it doesn't, this is considered a loss of communication between the application and PCI-1758UDO, and the outputs go to a user-defined safe state and remain in that state until the watchdog timer is disabled and new values are written by the software. After the watchdog timer expires, the PCI-1758UDO will ignore any writes until the watchdog timer is disabled. You can set the watchdog timer timeout period through the WDT register to specify the amount of time that must elapse before the watchdog timer expires. The counter on the watchdog timer is configurable up to (2<sup>32</sup>-1) x 100 ns (approximately seven minutes) before it expires.

#### Programmable Power-up Status Function (PCI-1758UDO)

User-configurable power-up states are useful for ensuring that the PCI-1758UDO powers up in a known state. When the system is power-up, all output lines of PCI-1758UDO are user-configurable for logic high output or logic low output. So the output can be predefined by users. This function ensures the card's output state can be defined at any time.

### Applications

1. Industrial On/Off control
2. Relay and switch monitoring and controlling
3. Industrial and lab automation

PCI-1758U

Pin Assignments

CNB										CNA									
PEF_COMM	100	50	PAB_COMM	NC	1	51	NC												
PEF_COMM	99	49	PAB_COMM	NC	2	52	NC												
PF_IDI07	98	48	PB_IDI07	NC	3	53	NC												
PF_IDI06	97	47	PB_IDI06	NC	4	54	NC												
PF_IDI05	96	46	PB_IDI05	NC	5	55	NC												
PF_IDI04	95	45	PB_IDI04	NC	6	56	NC												
PF_IDI03	94	44	PB_IDI03	P0_IDI00	7	57	P4_IDI00												
PF_IDI02	93	43	PB_IDI02	P0_IDI01	8	58	P4_IDI01												
PF_IDI01	92	42	PB_IDI01	P0_IDI02	9	59	P4_IDI02												
PF_IDI00	91	41	PB_IDI00	P0_IDI03	10	60	P4_IDI03												
PE_IDI07	90	40	PA_IDI07	P0_IDI04	11	61	P4_IDI04												
PE_IDI06	89	39	PA_IDI06	P0_IDI05	12	62	P4_IDI05												
PE_IDI05	88	38	PA_IDI05	P0_IDI06	13	63	P4_IDI06												
PE_IDI04	87	37	PA_IDI04	P0_IDI07	14	64	P4_IDI07												
PE_IDI03	86	36	PA_IDI03	P1_IDI00	15	65	P5_IDI00												
PE_IDI02	85	35	PA_IDI02	P1_IDI01	16	66	P5_IDI01												
PE_IDI01	84	34	PA_IDI01	P1_IDI02	17	67	P5_IDI02												
PE_IDI00	83	33	PA_IDI00	P1_IDI03	18	68	P5_IDI03												
NC	82	32	NC	P1_IDI04	19	69	P5_IDI04												
NC	81	31	NC	P1_IDI05	20	70	P5_IDI05												
NC	80	30	NC	P1_IDI06	21	71	P5_IDI06												
NC	79	29	NC	P1_IDI07	22	72	P5_IDI07												
NC	78	28	NC	P01_COMM	23	73	P45_COMM												
NC	77	27	NC	P01_COMM	24	74	P45_COMM												
NC	76	26	NC	NC	25	75	NC												
NC	75	25	NC	NC	26	76	NC												
PCD_COMM	74	24	P89_COMM	NC	27	77	NC												
PCD_COMM	73	23	P89_COMM	NC	28	78	NC												
PD_IDI07	72	22	P9_IDI07	NC	29	79	NC												
PD_IDI06	71	21	P9_IDI06	NC	30	80	NC												
PD_IDI05	70	20	P9_IDI05	NC	31	81	NC												
PD_IDI04	69	19	P9_IDI04	NC	32	82	NC												
PD_IDI03	68	18	P9_IDI03	P2_IDI00	33	83	P6_IDI00												
PD_IDI02	67	17	P9_IDI02	P2_IDI01	34	84	P6_IDI01												
PD_IDI01	66	16	P9_IDI01	P2_IDI02	35	85	P6_IDI02												
PD_IDI00	65	15	P9_IDI00	P2_IDI03	36	86	P6_IDI03												
PC_IDI07	64	14	P8_IDI07	P2_IDI04	37	87	P6_IDI04												
PC_IDI06	63	13	P8_IDI06	P2_IDI05	38	88	P6_IDI05												
PC_IDI05	62	12	P8_IDI05	P2_IDI06	39	89	P6_IDI06												
PC_IDI04	61	11	P8_IDI04	P2_IDI07	40	90	P6_IDI07												
PC_IDI03	60	10	P8_IDI03	P3_IDI00	41	91	P7_IDI00												
PC_IDI02	59	9	P8_IDI02	P3_IDI01	42	92	P7_IDI01												
PC_IDI01	58	8	P8_IDI01	P3_IDI02	43	93	P7_IDI02												
PC_IDI00	57	7	P8_IDI00	P3_IDI03	44	94	P7_IDI03												
NC	56	6	NC	P3_IDI04	45	95	P7_IDI04												
NC	55	5	NC	P3_IDI05	46	96	P7_IDI05												
NC	54	4	NC	P3_IDI06	47	97	P7_IDI06												
NC	53	3	NC	P3_IDI07	48	98	P7_IDI07												
NC	52	2	NC	P23_COMM	49	99	P67_COMM												
NC	51	1	NC	P23_COMM	50	100	P67_COMM												

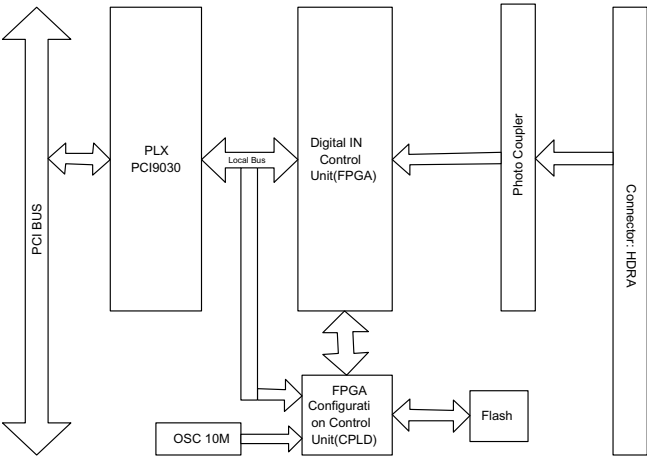
I/O Connector Pin Assignment for PCI-1758UDI

CNB										CNA									
PEF_COMP	100	50	PAB_COMP	P01_COMM	1	51	P45_COMM												
PEF_COMP	99	49	PAB_COMP	P01_COMM	2	52	P45_COMM												
PF_IDI07	98	48	PB_IDI07	P01_COMM	3	53	P45_COMM												
PF_IDI06	97	47	PB_IDI06	P01_COMM	4	54	P45_COMM												
PF_IDI05	96	46	PB_IDI05	P01_COMM	5	55	P45_COMM												
PF_IDI04	95	45	PB_IDI04	P01_COMM	6	56	P45_COMM												
PF_IDI03	94	44	PB_IDI03	P0_IDI00	7	57	P4_IDI00												
PF_IDI02	93	43	PB_IDI02	P0_IDI01	8	58	P4_IDI01												
PF_IDI01	92	42	PB_IDI01	P0_IDI02	9	59	P4_IDI02												
PF_IDI00	91	41	PB_IDI00	P0_IDI03	10	60	P4_IDI03												
PE_IDI07	90	40	PA_IDI07	P0_IDI04	11	61	P4_IDI04												
PE_IDI06	89	39	PA_IDI06	P0_IDI05	12	62	P4_IDI05												
PE_IDI05	88	38	PA_IDI05	P0_IDI06	13	63	P4_IDI06												
PE_IDI04	87	37	PA_IDI04	P0_IDI07	14	64	P4_IDI07												
PE_IDI03	86	36	PA_IDI03	P1_IDI00	15	65	P5_IDI00												
PE_IDI02	85	35	PA_IDI02	P1_IDI01	16	66	P5_IDI01												
PE_IDI01	84	34	PA_IDI01	P1_IDI02	17	67	P5_IDI02												
PE_IDI00	83	33	PA_IDI00	P1_IDI03	18	68	P5_IDI03												
PEF_COMM	82	32	PAB_COMM	P1_IDI04	19	69	P5_IDI04												
PEF_COMM	81	31	PAB_COMM	P1_IDI05	20	70	P5_IDI05												
PEF_COMM	80	30	PAB_COMM	P1_IDI06	21	71	P5_IDI06												
PEF_COMM	79	29	PAB_COMM	P1_IDI07	22	72	P5_IDI07												
PEF_COMM	78	28	PAB_COMM	P01_COMM	23	73	P45_COMM												
PEF_COMM	77	27	PAB_COMM	P01_COMM	24	74	P45_COMM												
NC	76	26	NC	NC	25	75	NC												
NC	75	25	NC	NC	26	76	NC												
PCD_COMP	74	24	P89_COMP	P23_COMM	27	77	P67_COMM												
PCD_COMP	73	23	P89_COMP	P23_COMM	28	78	P67_COMM												
PD_IDI07	72	22	P9_IDI07	P23_COMM	29	79	P67_COMM												
PD_IDI06	71	21	P9_IDI06	P23_COMM	30	80	P67_COMM												
PD_IDI05	70	20	P9_IDI05	P23_COMM	31	81	P67_COMM												
PD_IDI04	69	19	P9_IDI04	P23_COMM	32	82	P67_COMM												
PD_IDI03	68	18	P9_IDI03	P2_IDI00	33	83	P6_IDI00												
PD_IDI02	67	17	P9_IDI02	P2_IDI01	34	84	P6_IDI01												
PD_IDI01	66	16	P9_IDI01	P2_IDI02	35	85	P6_IDI02												
PD_IDI00	65	15	P9_IDI00	P2_IDI03	36	86	P6_IDI03												
PC_IDI07	64	14	P8_IDI07	P2_IDI04	37	87	P6_IDI04												
PC_IDI06	63	13	P8_IDI06	P2_IDI05	38	88	P6_IDI05												
PC_IDI05	62	12	P8_IDI05	P2_IDI06	39	89	P6_IDI06												
PC_IDI04	61	11	P8_IDI04	P2_IDI07	40	90	P6_IDI07												
PC_IDI03	60	10	P8_IDI03	P3_IDI00	41	91	P7_IDI00												
PC_IDI02	59	9	P8_IDI02	P3_IDI01	42	92	P7_IDI01												
PC_IDI01	58	8	P8_IDI01	P3_IDI02	43	93	P7_IDI02												
PC_IDI00	57	7	P8_IDI00	P3_IDI03	44	94	P7_IDI03												
PCD_COMM	56	6	P89_COMM	P3_IDI04	45	95	P7_IDI04												
PCD_COMM	55	5	P89_COMM	P3_IDI05	46	96	P7_IDI05												
PCD_COMM	54	4	P89_COMM	P3_IDI06	47	97	P7_IDI06												
PCD_COMM	53	3	P89_COMM	P3_IDI07	48	98	P7_IDI07												
PCD_COMM	52	2	P89_COMM	P23_COMM	49	99	P67_COMM												
PCD_COMM	51	1	P89_COMM	P23_COMM	50	100	P67_COMM												

I/O Connector Pin Assignment for PCI-1758UD0

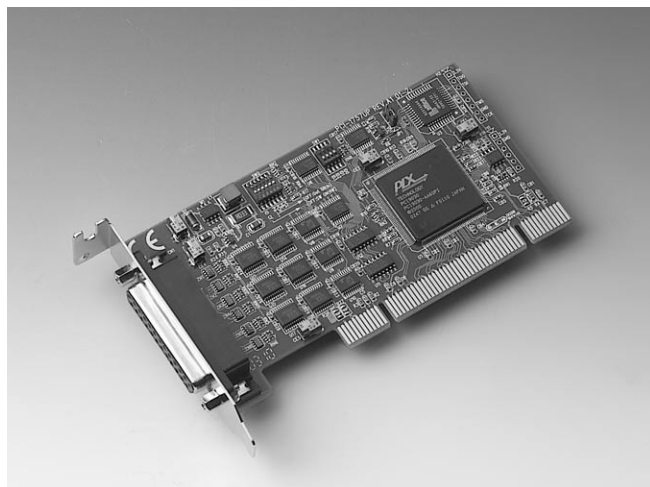
Block Diagram

PCI-1758UDI Block Diagram



# PCI-1757UP

## 24-channel Digital Input/Output Low Profile Universal PCI Card



CE

### Features

- Low profile PCI card
- Universal PCI card, fits 3.3 V and 5 V PCI slot
- 24 TTL level digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits provide higher driving capability
- Output status read-back
- I/O configurable by software or on board DIP switch
- Keeps port I/O settings and digital output states after hot reset
- BoardID™ switch
- High density D-SUB 25-pin connector

### Introduction

The PCI-1757UP is a 24-bit DI/O low profile PCI card that meets the PCI standard REV.2.2 (universal PCI expansion card). The card also works with 3.3 V and 5 V PCI slots, and provides you with 24 bits of parallel digital input/output, that emulates mode 0 of the 8255 PPI chip. However, the buffered circuits offer a higher driving capability than the 8255.

### Specifications

#### Digital Input

- **Logic High Voltage** 2.0 to 5.25 V
- **Logic Low Voltage** 0.0 to 0.80 V
- **High Level Input Current** 20 mA
- **Low Level Input Current** -0.2 mA

#### Digital Output

- **Logic High Voltage** 2.4 V minimum
- **Logic Low Voltage** 0.4 V maximum
- **High Level Input Current** 15 mA maximum (source)
- **Low Level Input Current** 24 mA maximum (sink)
- **Driving Capability** 15 LS TTL

#### Interrupt Source

- PC0, PC4

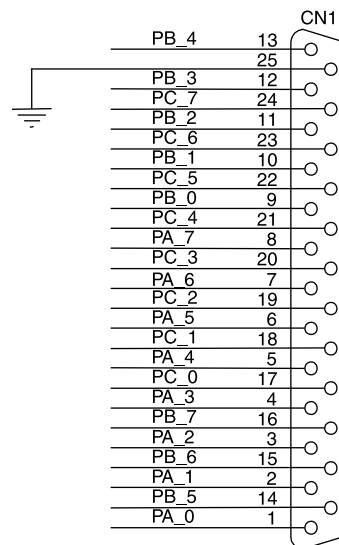
#### General

- **Connector** One D-SUB 25-pin female connector
- **Power Consumption** 5 V @ 140 mA (Typical)
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
- **Storage Temperature** -20 ~ 80° C (-4 ~ 176° F)
- **Humidity** 5 ~ 95% non-condensing
- **Dimensions** 119.91 x 64.41 mm (4.721" x 2.536") Low profile PCI MD1 card size

### Ordering Information

- **PCI-1757UP** 24-channel Digital Input/Output Card
- **ADAM-3925** DB-25 wiring terminal for DIN-rail mounting

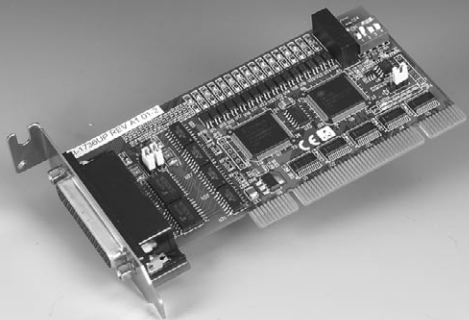
### Pin Assignments



# PCI-1736UP

## 32-channel Isolated Digital Input/Output Card

NEW



### Features

- 32 isolated DI/O channels (16 inputs and 16 outputs)
- High output driving capacity
- High-voltage isolation on I/O channels (2500 VDC)
- Interrupt handling capability
- D-type connector for isolated input and output channels
- Keep digital output values when hot system reset
- Wide input range (5 ~ 50 V<sub>DC</sub>)
- Surge protection
- Universal PCI Bus
- Low profile card
- BoardID™ switch

### Introduction

PCI-1736UP offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V<sub>DC</sub>, which makes it ideal for industrial applications where high-voltage isolation is required.

In addition, all output channels provide high-voltage protection. The low profile PCI form factor and universal PCI connector (V2.2 compliant) meet requirements for size and power consumption.

### Specifications

- **Bus interface** PCI bus spec. 2.2 compliant  
PCI universal card (both 3.3V and 5V signaling)
- **IRQ** All ports use the same IRQ assigned by PCI Plug-and-Play
- **I/O Channels** 16 Isolated DI and 16 Isolated DO
- **Isolation Protection** 2500 V<sub>DC</sub>
- **Input Voltage Range** 5-50 V<sub>DC</sub>
- **Output Voltage Range** Open collector 5-40 V<sub>DC</sub>
- **Connector** DB-44 female connector
- **Dimensions** Low profile PCI MD1 (119.91 x 64.41 mm)
- **Operating Temperature** 0 ~ 60 °C (32 ~ 140° F)
- **Storage Temperature** -25 ~ 85 °C (-4 ~ 185° F)
- **Operating Humidity** 5 ~ 95% Relative Humidity, non-condensing

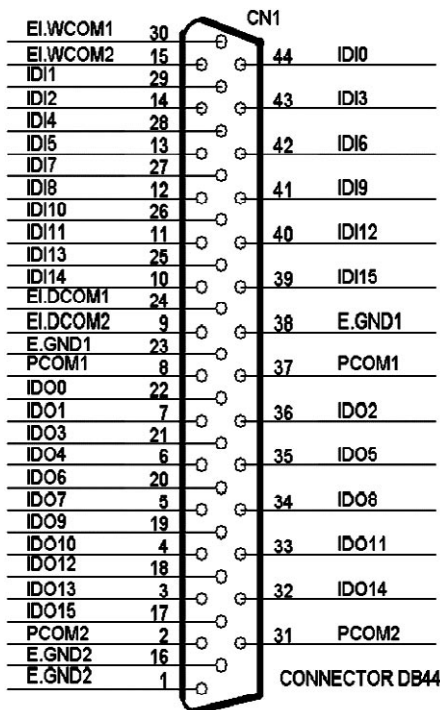
### Ordering Information

- **PCI-1736UP** 32-channel isolated digital input/output card
- **PCL-10144-1** DB 44-pin cable, 1m
- **ADAM-3944** DB-44 Wiring Terminal for DIN-rail mounting

### Applications

- Industrial on/off control
- Contact closure monitoring
- Switch status sensing
- BCD interfacing
- Digital input control
- Industrial and lab automation

### Pin Assignments



1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

9  
Motion Control

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ICOM

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eConnectivity

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UNO

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ADAM-4000

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ADAM-5000

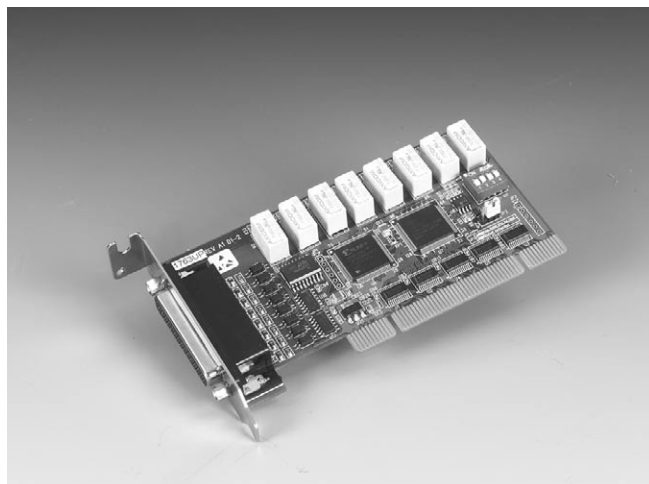
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ADAM-6000

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ADAM-8000

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BAS

# PCI-1763UP

## 8-ch Relay and 8-ch Isolated DI card



### Features

- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 8 Form C type relay output channels
- Output status read-back
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (3,750 V<sub>DC</sub>)
- High ESD protection (2,000 V<sub>DC</sub>)
- High over-voltage protection (70 V<sub>DC</sub>)
- Wide input range (10 ~ 50 V<sub>DC</sub>)
- Interrupt handling capability
- Support Universal PCI Bus
- Low Profile PCI card
- BoardID™ switch

### Introduction

PCI-1763UP relay actuator and isolated D/I card is an add-on card for the PCI bus. It provides 8 optically-isolated digital inputs with isolation protection of 2500 VDC for collecting digital inputs in noisy environments, and 8 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The PCI-1761's eight optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials. The low profile PCI form factor and universal PCI connector (V2.2 compliant), meet requirements for size and reduced power consumption.

### Specifications

#### Isolated Digital Input

- Channels 8
- Optical Isolation 3,750 V<sub>DC</sub>
- Opto-isolator 25 μs
- Response Time
- Over-Voltage Protection 70 V<sub>DC</sub>
- Input Voltage 5 ~ 50 V<sub>DC</sub>
- Input Current 3.16 mA @ 10 V<sub>DC</sub>  
17.3 mA @ 50 V<sub>DC</sub>

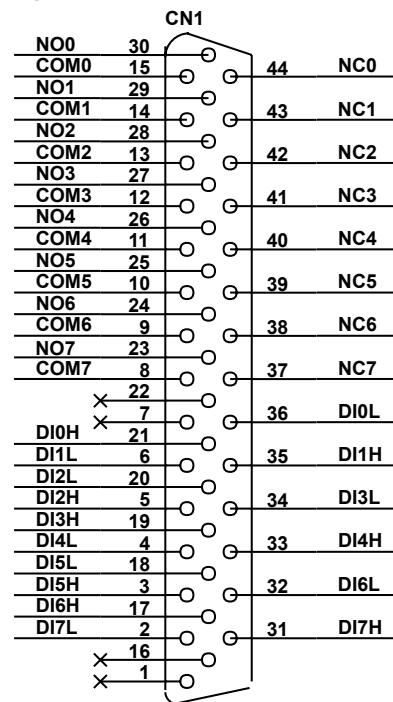
#### Relay Output

- Channels 8
- Relay Type DPDT (8 Form C)
- Rating (resistive) 0.25 A @ 240 V<sub>AC</sub> or 1 A @ 30 V<sub>DC</sub>
- Max. Switching Power 62.5 AV, 60 W
- Insulation Resistance 1,000 MΩ min. (at 500 V<sub>DC</sub>)
- Operate Time 5 ms max.
- Release Time 4 ms max.
- I/O Connector Type DB44 female
- Dimensions 119.91 x 64.41 mm
- Power Consumption +5V @ 107.5 mA (typical)  
+5V @ 301.3 mA (max.)

#### Environment

- Operating Temperature 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1,2)
- Storage Temperature -20 ~ 70° C (-4 ~ 158° F)
- Relative Humidity 5 ~ 95 % RH non-condensing (refer to IEC 68-2-3)

### Pin Assignments



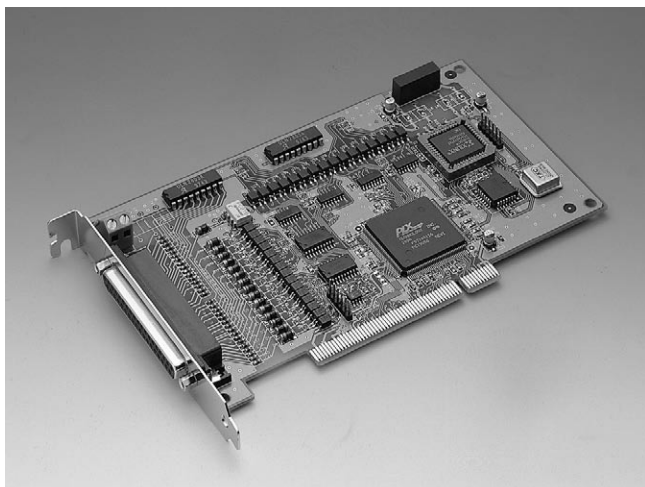
### Ordering Information

- PCI-1763UP 8-ch Relay and 8-ch Isolated DI card
- PCL-10144-1 DB 44-pin cable, 1m
- ADAM-3944 DB-44 Wiring Terminal for DIN-rail mounting



# PCI-1750

## 32-ch Isolated Digital I/O and Counter Card



CE

### Features

- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all isolated channels (2,500 V<sub>DC</sub>)
- High sink current on isolated output channels (200 mA/channel)
- Supports dry contact or 5 ~ 50 V<sub>DC</sub> isolated inputs
- Interrupt handling
- Timer/counter interrupt capability

### Introduction

PCI-1750 offers 16 isolated digital input channels, 16 isolated digital output channels, and one isolated counter/timer for the PCI bus. With isolation protection of 2,500 V<sub>DC</sub>, and dry contact support, PCI-1750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the PCI-1750 corresponds to a bit in a PC I/O port. This makes PCI-1750 very easy to program. This card also offers a counter or timer interrupt and two digital input interrupt lines to a PC. So you can then easily do configurations by software.

### Plug & Play

PCI-1750 uses a PCI controller to interface the card to the PCI bus. The controller fully implements PCI bus specification Rev 2.1. All bus relative configurations, such as base address and interrupt assignment, are automatically controlled by the software. No jumper or DIP switch is required for user configuration.

### On-board Programmable Counter/Timer

PCI-1750 provides a programmable counter/timer for generating periodic interrupts to the host computer. The counter/timer chip is an 82C54, which includes three 16-bit counters based on a 10 MHz clock. One counter is used to count events coming from the isolated input channel. The other two are cascaded together to make a 32-bit timer.

### Specifications

#### Digital Input

- 16 Optically-isolated Inputs
- Input Range 5 ~ 50 V<sub>DC</sub> or dry contact
- Isolation Voltage 2,500 V<sub>DC</sub>
- Throughput 10 kHz

#### Digital Output

- 16 Optically-isolated Outputs
- Output Range Open collector 5 ~ 40 V<sub>DC</sub>
- Sink Current 200 mA max. per channel
- Isolation Voltage 2,500 V<sub>DC</sub>
- Throughput 10 kHz

#### Programmable Counter/Timer

- One 32-bit timer
- One 16-bit optically-isolated Counter
  - Shares pin with isolated input 15
  - Throughput: 1 MHz max.
  - Isolation voltage: 2,500 V<sub>DC</sub>

#### General

- Interrupt Source Isolated input 0, 8, counter and timer
- Power Consumption 5 V @ 850 mA (typical), 5 V @ 1.0 A (max.)
- Operating Temperature 0 ~ 70° C (32 ~ 158° F)
- Storage Temperature -20 ~ 80° C (-4 ~ 176° F)
- Operating Humidity 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Connectors One 37-pin D-type female connector  
One 2-pin terminal block for extended ground
- Dimensions (L x H) 175 x 100 mm (6.9" x 3.9")

### Ordering Information

- PCI-1750 32-channel Isolated DIO and Counter Card, user's manual and driver CD-ROM. (cable not included)
- PCL-10137-1 DB37 cable assembly, 1m
- PCL-10137-2 DB37 cable assembly, 2m
- PCL-10137-3 DB37 cable assembly, 3m
- ADAM-3937 37-pin D-type cable wiring terminal for DIN-rail mounting

### Applications

- Industrial on/off control
- Contact closure monitoring
- Switch status sensing
- BCD interfacing
- Digital I/O control
- Industrial and lab automation

### Pin Assignments

EX0	1	20	EX1
EX2	2	21	EX3
EX4	3	22	EX5
EX6	4	23	EX7
EX8	5	24	EX9
EX10	6	25	EX11
EX12	7	26	EX13
EX14	8	27	EX15/Counter2
EX16	9	28	EX17
COM1	10	29	EX18
EX0	11	30	EX1
EX2	12	31	EX3
EX4	13	32	EX5
EX6	14	33	EX7
EX8	15	34	EX9
EX10	16	35	EX11
EX12	17	36	EX13
EX14	18	37	EX15
COM2	19		

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

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Motion Control

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ICOM

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eConnectivity

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UNO

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ADAM-4000

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ADAM-5000

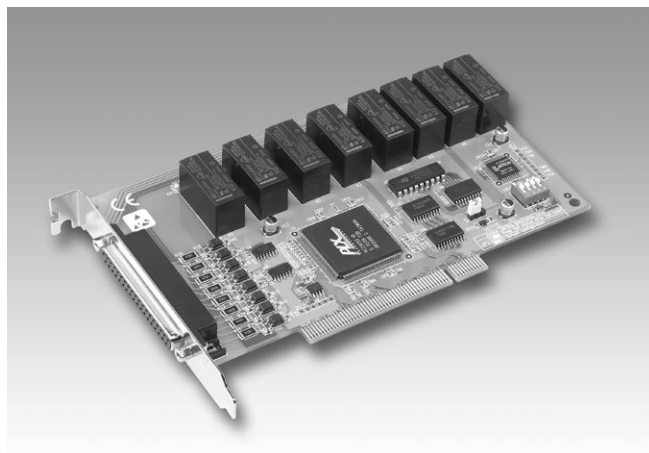
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ADAM-6000

16  
ADAM-8000

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BAS

# PCI-1761

## 8-ch Relay Actuator and 8-ch Isolated Digital Input Card



CE

### Features

- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 4 Form C and 4 Form A type relay output channels
- Output status read-back
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (3,750 V<sub>DC</sub>)
- High ESD protection (2,000 V<sub>DC</sub>)
- High over-voltage protection (70 V<sub>DC</sub>)
- Wide input range (10 ~ 50 V<sub>DC</sub>)
- Interrupt handling capability
- BoardID™ switch

### Introduction

The PCI-1761 relay actuator and isolated D/I card is an add-on card for the PCI bus. It provides 8 optically-isolated digital inputs with isolation protection of 3,750 V<sub>DC</sub> for collecting digital inputs in noisy environments and 8 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The PCI-1761's eight optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials.

#### Rugged Protection

The PCI-1761 digital input channels feature a rugged isolation protection for industrial, lab and machinery automation applications. It durably withstands voltage up to 3,750 V<sub>DC</sub>, protecting your host system from any incidental harms. If connected to an external input source with surge-protection, the PCI-1761 can offer up to a maximum of 2,000 V<sub>DC</sub> ESD (Electrostatic Discharge) protection. Even with an input voltage rising up to 70 V<sub>DC</sub>, the PCI-1761 can still manage to work properly, albeit for only a short period of time.

#### Reset Protection Fulfills Requirement for Industrial Applications

When the system has undergone a hot reset (i.e. without turning off the system power), the PCI-1761 can either retain output values of each channel, or return to its default configuration as open status, depending on its onboard jumper setting. This function protects the system from unwanted operations during unexpected system resets.

### Specifications

#### Isolated Digital Input

- Channels 8
- Optical Isolation 3,750 V<sub>DC</sub>
- Opto-isolator 25 μs
- Response Time
- Over-Voltage Protection 70 V<sub>DC</sub>
- Input Voltage 10 ~ 50 V<sub>DC</sub>
- Input Current 1.6 mA @ 10 V<sub>DC</sub>  
8.9 mA @ 50 V<sub>DC</sub>

#### Relay Output

- Channels 8
- Relay Type SPDT (4 Form C and 4 Form A)
- Rating (resistive) 3 A @ 250 V<sub>AC</sub> or 3 A @ 24 V<sub>DC</sub>
- Max. Switching Power 750 AV, 72 W
- Max. Switching Load 10 mA @ 5 V<sub>DC</sub>
- Insulation Resistance 1,000 MΩ min. (at 500 V<sub>DC</sub>)
- Operate Time 15 ms max.
- Release Time 5 ms max.

#### General

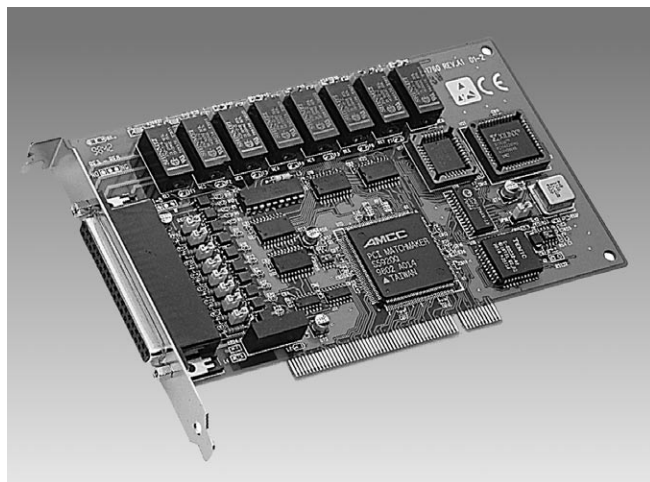
- Connector One 37-pin D-type connector
- Dimensions (L x H) 175 x 100 mm (6.9" x 3.9")
- Power Consumption +5 V @ 220 mA (typical)  
+5 V @ 750 mA (max.)
- Operating Temperature 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- Storage Temperature -20 ~ 70° C (-4 ~ 158° F)
- Operating Humidity 5 ~ 95 % RH non-condensing (refer to IEC 68-2-3)

### Ordering Information

- PCI-1761 8-ch Relay Actuator and 8-ch Isolated D/I Card
- PCL-10137-1 DB37 cable assembly, 1m
- PCL-10137-2 DB37 cable assembly, 2m
- PCL-10137-3 DB37 cable assembly, 3m
- ADAM-3937 DB37 Wiring Terminal for Din-rail Mounting
- PCLD-880 Universal screw terminal board

# PCI-1760 PCI-1760U

## 8-ch Relay Actuator and Isolated D/I Card



FCC CE

### Features

- Universal PCI card, for 3.3 V and 5 V PCI slot
- 8 opto-isolated digital input channels
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of State" interrupt function for DI
- Universal PCI and BoardID switch (PCI-1760U only)

### Introduction

The PCI-1760U relay actuator and isolated D/I card is a PC add-on card for the PCI bus. It meets the PCI standard Rev. 2.2 (Universal PCI expansion card), and works with both 3.3 V and 5 V PCI slots. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V<sub>DC</sub> for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

### Specifications

#### Isolated Digital Input

- **Channels** 8 (Sink)
- **Opto-isolator** PC354
- **Input Voltage** 5 ~ 12 V<sub>DC</sub>  
High: > 4.5 V  
Low: < 1.0 V  
Uncertain: 1.0 V ≥ V<sub>in</sub> ≥ 4.5 V
- **Input Resistance** 1 kΩ 1/4 W
- **Isolation Voltage** 2,500 V<sub>DC</sub>
- **Digital Filter** Minimum effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms  
Minimum effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
- **16-bit UP Counter** Maximum effective input frequency: 500 Hz  
Minimum High period ≥ 1 ms  
Minimum Low period ≥ 1 ms

#### Relay Output

- **Channels** 8
- **Relay Type** Single-pole double-throw (SPDT, Form C)
- **Output Type** CH0 and CH1: NC and NO outputs  
CH2 ~ CH7: NC or NO outputs (selected by jumper)
- **Rating Contact Load** 120 V<sub>DC</sub> @ 0.5 A or 30 V<sub>DC</sub> @ 1 A
- **Contact Resistance** Less than 100 mΩ initially
- **Dielectric Strength** Coil to contacts (deenergized): 1,500 V<sub>RMS</sub> (1 minute)  
Between open contacts (deenergized & energized): 1,000 V<sub>RMS</sub> (1 minute)
- **Life Expectancy** 200,000 operations @ 0.5 A 120 V<sub>AC</sub>  
500,000 operations @ 1.0 A 30 V<sub>DC</sub>
- **Operating Time** 5 ms max.
- **Releasing Time** 5 ms max.

#### Isolated PWM output

- **Channels** 2
- **Isolation Voltage** 2,500 V<sub>DC</sub>
- **Scaling Resolution** 16 bits (100 ms for each step)  
High period = [(1 ~ 65535) x 100 ms] + 50 ms (max.)  
Low period = [(1 ~ 65535) x 100 ms] + 50 ms (max.)
- **Output Level** High: (5 ± 0.5) V  
Low: < 0.8 V

#### General

- **Power Consumption** +5 V @ 450 mA (typical), 850 mA (max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68 - 2 - 1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95 % RH non-condensing (IEC 68-2-3)

#### Physical

- **Connector** One 37-pin D-type connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")

### Ordering Information

- **PCI-1760U** Relay Actuator and Isolated D/I Card, user's manual and driver CD-ROM (cable not included)
- **PCI-1760** 8-ch Relay Actuator and Isolated D/I card
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

### Applications

- Digital signal and contact status monitoring
- Industrial On/Off control
- Signal switching
- External relay driving

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Software

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IPPC

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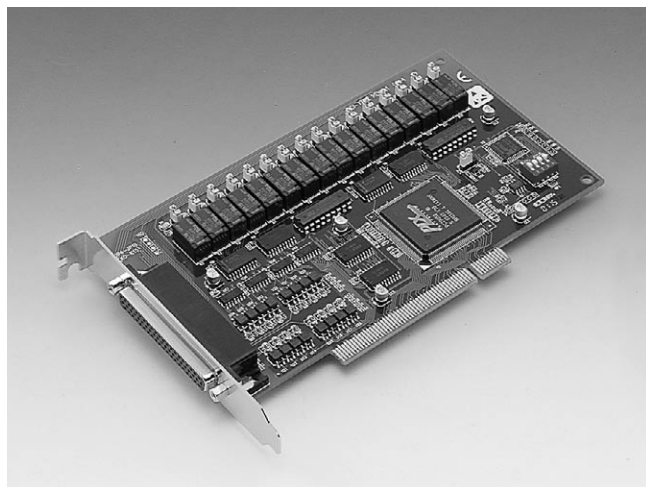
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BAS

# PCI-1762

## 16-ch Isolated Digital Input and 16-ch Relay Output Card



CE

### Features

- 16 relay output channels and 16 isolated digital input channels
- LED indicators to show activated relays
- Jumper selectable Form A/Form B-type relay output channel
- Output status read-back
- Retain relay output values when hot system reset
- High-voltage isolation on input channels (2,500 V<sub>DC</sub>)
- High ESD protection (2,000 V<sub>DC</sub>)
- High over-voltage protection (70 V<sub>DC</sub>)
- Wide input range (10 ~ 50 V<sub>DC</sub>)
- Interrupt handling capability
- High-density DB-62 connector
- BoardID™ switch

### Introduction

The PCI-1762 relay actuator and isolated D/I card is a PC add-on card for the PCI bus. It provides 16 opto-isolated digital inputs with isolation protection of 2,500 V<sub>DC</sub> for collecting digital inputs in noisy environments, 16 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The PCI-1762's sixteen optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials.

### Specifications

#### Isolated Digital Input

- **Input Channels** 16
- **Optical Isolation** 2,500 V<sub>DC</sub>
- **Opto-Isolator** 25  $\mu$ s
- **Response Time**
- **Over-Voltage Protection** 70 V<sub>DC</sub>
- **Input Voltage**
  - VIH (max.) 50 V<sub>DC</sub>
  - VIH (min.) 10 V<sub>DC</sub>
  - VIL (max.) 3 V<sub>DC</sub>
- **VIL (max.)**
  - 10 V<sub>DC</sub> 1.6 mA (typical)
  - 12 V<sub>DC</sub> 1.9 mA (typical)
  - 24 V<sub>DC</sub> 4.1 mA (typical)
  - 48 V<sub>DC</sub> 8.5 mA (typical)
  - 50 V<sub>DC</sub> 8.9 mA (typical)

#### Relay Output

- **Output Channels** 16
- **Relay Type** SPDT (Form A or Form B, Jumper selectable)
- **Rating (resistive)** 0.5 A @ 125 V<sub>AC</sub> or 1 A @ 30 V<sub>DC</sub>
- **Max. Switching Power** 62.5 AV, 30 W
- **Max. Switching Voltage** 250 V<sub>AC</sub>, 220 V<sub>DC</sub>
- **Max. Switching Current** 2 A
- **Minimum Switching Load** 10  $\mu$ A @ 10 m V<sub>DC</sub>
- **Breakdown Voltage** 1,500 V<sub>AC</sub> for 1 min. (between coil and contacts)
- **Operate Time** 6 ms max.
- **Release Time** 4 ms max.
- **Insulation Resistance** 1,000 M $\Omega$  min. (at 500 V<sub>DC</sub>)
- **Life Expectancy** 2 x 10<sup>5</sup> ops. min. (0.5 A @ 125 V<sub>AC</sub>) , 5 x 10<sup>5</sup> ops. min. (1 A @ 30 V<sub>DC</sub>)

#### General

- **I/O Connector Type** DB62 D-type female connector
- **Dimensions** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
  - +5V @ 250 mA (typical)
  - +5V @ 620 mA (max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1,2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Relative Humidity** 5 ~ 95 % non-condensing (IEC 68-2-3)
- **Certification** CE Class A

### Ordering Information

- **PCI-1762** 16-ch Isolated Digital Input and 16-ch Relay Output Card
- **PCL-10162-1** PCL-10162-1 DB-62 cable assembly, 1m
- **PCL-10162-3** PCL-10162-3 DB-62 cable assembly, 3m
- **PCL-10162-5** PCL-10162-5 DB-62 cable assembly, 5m
- **ADAM-3962** DB62 Wiring Terminal for Din-rail Mounting

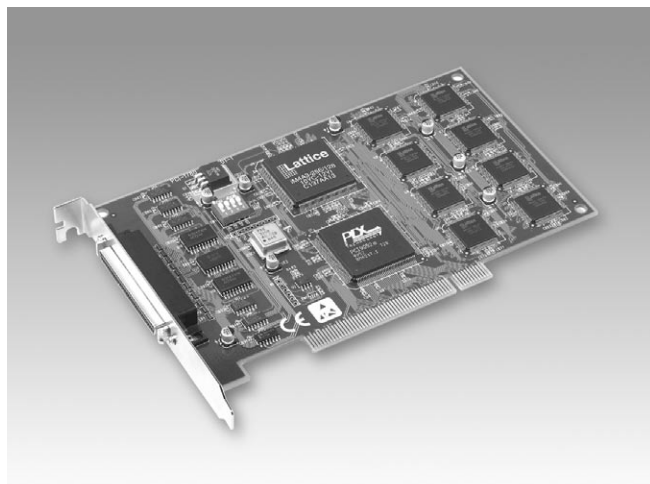
### Applications

- Industrial On/Off control
- Switch status sensing
- Digital I/O control
- Industrial and lab automation
- SMT/PCB machinery
- Semi-conductor machinery
- PC-based Industrial Machinery
- Testing & Measurement
- Laboratory & Education
- External relay driving



# PCI-1780

## 8-ch Counter/Timer Card



CE

### Features

- 8 independent 16-bit counters
- 8 programmable clock source
- 8 digital TTL outputs and 8 digital TTL inputs
- Up to 20 MHz input frequency
- Multiple counter clock source selectable
- Counter output programmable
- Counter gate function
- Flexible interrupt source select
- BoardID™ switch

### Introduction

PCI-1780 is a general purpose multiple channel counter/timer card for the PCI bus. It targets the AM9513 to implement the counter/timer function by CPLD. Plus, it provides eight 16-bit counter channels and 8 digital outputs and 8 digital inputs. Advantech has designed powerful counter functions to for a broad range of industrial and laboratory applications.

#### Flexible Counter Modes

The PCI-1780 features up to 12 programmable counter modes, to provide one shot output, PWM output, periodic interrupt output, time-delay output, and to measure the frequency and the pulse width. The PCI-1780 is an ideal solution for various counter/timer applications.

#### Special Shielded Cable for Noise Reduction

The PCL-10168 shielded cable is specially designed for the PCI-1780 for reducing noise. Its wires are all twisted pairs, and the input signals and output signals are separately shielded, providing minimal cross talk between signals and the best protection against EMI/EMC problems.

#### BoardID™ Switch

PCI-1780 has a built-in BoardID™ DIP switch that helps define each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

#### Plug & Play Function

PCI-1780 is a Plug & Play device which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches. Instead, all

### Specifications

#### Programmable Counter

- |                              |                   |
|------------------------------|-------------------|
| ▪ Channels                   | 8 (independent)   |
| ▪ Resolution                 | 16-bit            |
| ▪ Programmable Clock Source  | 8 independent     |
| ▪ Programmable Counter Modes | 12                |
| ▪ Max. Frequency             | 20 MHz            |
| ▪ Interrupt Source           | 8 counter outputs |

#### Digital Input/Output

- |                    |  |
|--------------------|--|
| ▪ Input Channels   | 8  |
| ▪ Input Voltage    | Low: 0.8 V max.<br>High: 2.4 V min.                                |
| ▪ Interrupt Source | Channel 0  |
| ▪ Output Channels  | 8  |
| ▪ Output Voltage   | Low 0.5 V max. @ 24 mA (sink)<br>High 2.4 V min. @ -15 mA (source) |

#### General

- |                         |  |
|-------------------------|--|
| ▪ I/O Connector Type    | 68-pin SCSI-II female                        |
| ▪ Dimensions            | 175 x 100 mm (6.9" x 3.9")                   |
| ▪ Power Consumption     | Typical: +5 V @ 900 mA<br>Max.: +5 V @ 1.2 A |
| ▪ Operating Temperature | 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)      |
| ▪ Storage Temperature   | -20 ~ 70 °C (-4 ~ 158 °F)                    |
| ▪ Relative Humidity     | 5 ~ 95 % RH non-condensing (IEC 68-2-3)      |
| ▪ Certifications        | CE certified                                 |
| ▪ PWM Range             | 0.0005 ~ 60 Sec.                             |

### Ordering Information

- |             |   |
|-------------|---|
| ▪ PCI-1780  | 8-channel Counter/Timer Card  |
| ▪ PCL-10168 | 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m |
| ▪ ADAM-3968 | 68-pin SCSI-II Wiring Terminal Board for DIN-rail mounting  |

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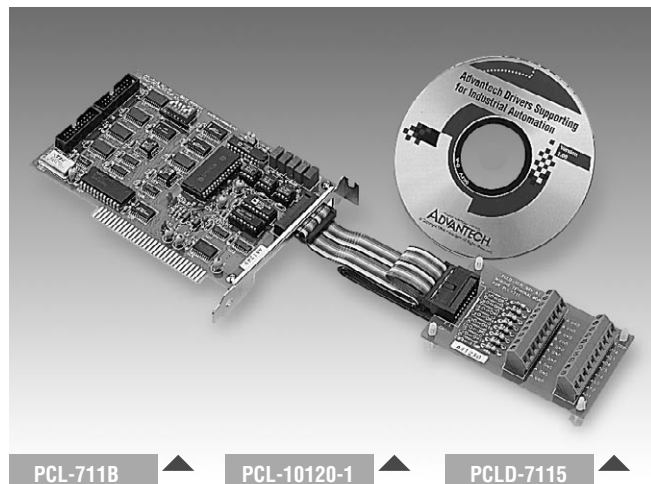
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# PCL-711

## Analog and Digital I/O Card



### Features

- Eight single-ended analog inputs
- Programmable A/D input range
- A/D, D/A with pacer
- One analog output
- 12-bit A/D and D/A resolution
- 16 digital inputs
- 16 digital outputs
- Includes versatile drivers in popular programming languages plus calibration, demo and example programs
- Screw-terminal board and cable included

### Introduction

PCL-711 is a fully-integrated package that offers four of the most popular I/O functions for PC/AT and compatible systems: A/D conversion, D/A conversion, digital input and digital output.

The inexpensive PCL-711 is ideal for entry level applications. The features of this half-sized card include: eight 12-bit analog inputs, one 12-bit analog output, 16 digital inputs and 16 digital outputs. In addition, it comes with a 20-point screw-terminal board and a flat cable connector.

PCL-711 performs a variety of I/O jobs, and features solid software support and a large selection of available daughterboards and accessories. It is an ideal and affordable performer for OEMs, schools and hobbyists who require a combination of analog and digital I/O.

### Specifications

#### Analog Input

- **Channels** 8 single-ended
- **A/D Converter** 12 bit, 25  $\mu$ s conversion time
- **Input Range (V)**  $\pm 5$ ,  $\pm 2.5$ ,  $\pm 1.25$ ,  $\pm 0.625$ ,  $\pm 0.3125$
- **Trigger Mode** Software, pacer or external trigger
- **Data Transfer** Program control, interrupt (IRQs 2 ~ 7)
- **Accuracy**  $\pm 2$  LSB
- **Common Mode Rejection** 60 dB typical
- **Input Impedance**  $> 10$  M $\Omega$
- **Input Overvoltage**  $\pm 30$  V<sub>DC</sub> max.

#### Analog Output

- **Channels** One 12-bit double-buffered channel
- **D/A Range** 0 ~ 5 V or 0 ~ 10 V
- **Settling Time** 30  $\mu$ s

#### Digital Input

- **Channels** 16, TTL level

#### Digital Output

- **Channels** 16
- **Logic level 0** 0.5 V max. @ 8 mA (sink)
- **Logic level 1** 2.4 V min. @ 0.4 mA (source)

#### General

- **Power Consumption** +5 V @ 500 mA typical, 1.0 A max.  
+12 V @ 50 mA typical, 100 mA max.

- **Operating Temperature** -12 V @ 14 mA typical, 20 mA max.  
0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **I/O Ports** 16 consecutive I/O ports per card
- **Connectors** One 20-pin flat cable connector for A/D and D/A  
One 20-pin flat cable connector for digital input  
One 20-pin flat cable connector for digital output
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")

### Ordering Information

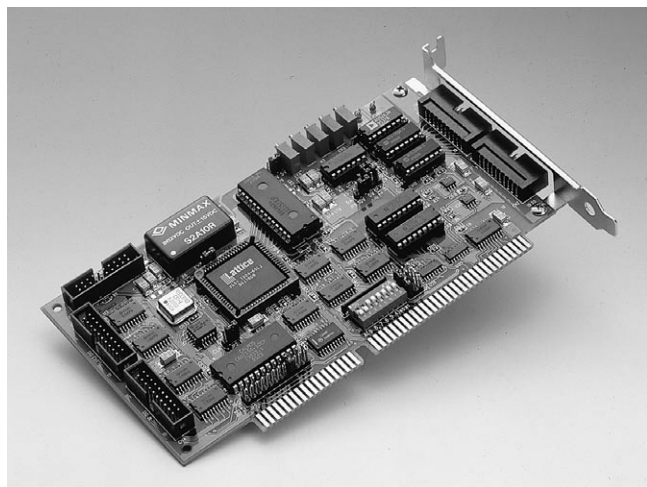
- **PCL-711S** PCL-711B card, user's manual, driver CD-ROM, PCLD-7115 and 1 m 20-pin flat cable (PCL-10120-1)
- **PCL-711B** PCL-711B card only (PCLD-7115, 1 m 20-pin cable, user manual and driver CD-ROM NOT included).
- **PCL-10120-1** 20-pin flat cable, 1m
- **PCL-10120-2** 20-pin flat cable, 2m

### Applications

- DC voltage measurement
- Transducer/sensor interfacing
- Process control
- Contact closure monitoring
- Digital signal and BCD interfacing
- Industrial On/Off control
- Multiplexer and relay control

# PCL-812PG

## MultiLab Analog and Digital I/O Card



CE

### Features

- 16 single-ended 12-bit analog input channels
- Two 12-bit analog output channels
- Programmable sampling rate of up to 30 kHz
- A/D with DMA or interrupt
- 16 digital input channels
- 16 digital output channels
- Programmable counter/timer
- Programmable A/D ranges (gains)
- Includes C/C++, Pascal and BASIC drivers as well as calibration, demo and example programs
- Comprehensive application software support

### Introduction

PCL-812PG is a multifunction analog and digital I/O card that features the five most desired measurement and control functions for PC/AT and compatible systems: A/D conversion, D/A conversion, digital input, digital output and counter/timer. This half-size card neatly packages 16 12-bit analog input channels, two 12-bit analog output channels, 16 digital input channels, 16 digital output channels and a programmable counter/timer.

In addition to all the features listed above, PCL-812PG offers the convenience of programmable analog input ranges, where the analog input range can be switched by software commands instead of DIP switches. PCL-812PG also delivers convenience and maximum resolution for applications that need different gains for different channels or different gains for different stages of a process.

Comprehensive software support, numerous I/O options and a wide range of available daughterboards make the PCL-812PG ideal for industrial applications that require a combination of analog and digital I/O.

### Specifications

#### Analog Input

- **Channels** 16 single-ended
- **A/D Converter** 12-bit, 25  $\mu$ s conversion time
- **Input Range (V, software programmable)**  $\pm 10$ ,  $\pm 5$ ,  $\pm 2.5$ ,  $\pm 1.25$ ,  $\pm 0.625$ ,  $\pm 0.3125$
- **Trigger Mode** Software, pacer or external trigger
- **Data Transfer** Program controlled, interrupt 2 ~ 7, 9 ~ 12, 14, 15 or DMA (Channel 1 or 3) for single channel scan
- **Accuracy** 0.01% of reading  $\pm 1$  LSB
- **Common Mode Rejection** 60 dB typical
- **Input Impedance**  $> 10 \text{ M}\Omega$
- **Overvoltage** Continuous  $\pm 30 \text{ V}_{\text{DC}}$  max.

#### Analog Output

- **Channels** Two double-buffered 12-bit channels
- **D/A Range (in V)** 0 ~ 5, 0 ~ 10 w/internal reference;  $\pm 10 \text{ V}$  max. with external AC or DC reference (accuracy for output above  $\pm 9 \text{ V}$  may vary depending on power supply used)
- **Settling Time** 30  $\mu$ s
- **Throughput** 30 kS/s max.
- **Output Current**  $\pm 5 \text{ mA}$  max.
- **Linearity**  $\pm 1/2$  bit

#### Digital Input

- **Channels** 16, TTL level

#### Digital Output

- **Channels** 16, TTL compatible
- **Driving Capacity** 8.0 mA @ 0.5 V (sink); 0.4 mA @ 2.4 V (source)

#### A/D pacer and counter (8254 compatible)

- **A/D Pacer** 32-bit timer with a 20 MHz time base
- **Max. and Min. Rates** 500 kHz ~ 0.00046 Hz (one sample every 36 minutes)
- **Counter** One 16-bit counter with a 2 MHz time base

#### General

- **Power Consumption** +5 V @ 500 mA typical, 1.0 A max.  
+12 V @ 50 mA typical, 100 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **I/O Ports** 16 consecutive bytes
- **Connectors** Two 20-pin flat cable connectors
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

### Ordering Information

- **PCL-812PG** MultiLab Analog and Digital I/O Card, user's manual and driver CD-ROM. (cable not included)
- **PCL-10120-1** 20-pin flat cable, 1m
- **PCL-10120-2** 20-pin flat cable, 2m
- **PCLD-780** Screw terminal board
- **PCLD-8115** Industrial wiring terminal board with CJC circuit

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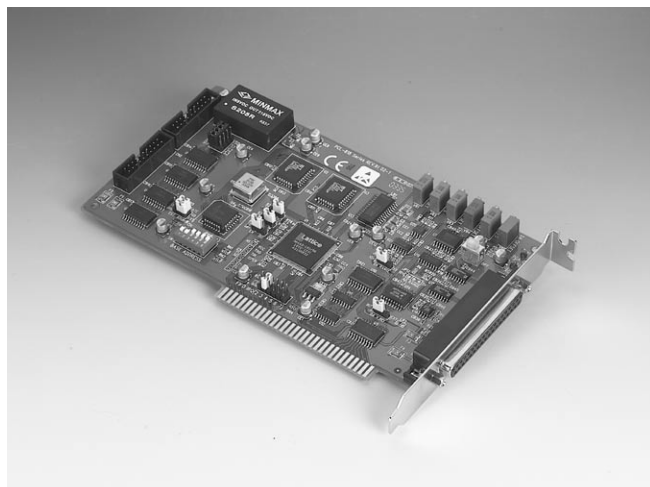
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# PCL-818 Series

## High-Performance Multifunction Cards



CE

### Features

- 16 single-ended or 8 differential analog inputs
- 12-bit A/D converter
- Programmable gain for each input channel
- Automatic channel/gain scanning with DMA
- 16 digital inputs and 16 digital outputs
- One 12-bit analog output channel
- Programmable pacer/counter

### Introduction

The PCL-818 series is a family of high-performance, multifunction cards that offer the five most desired measurement and control functions: 12-bit A/D conversion, D/A conversion, digital input, digital output and counter/timer.

#### Automatic Channel/Gain Scanning

All PCL-818 cards feature an automatic channel/gain scanning circuit. This circuit, instead of your software, controls multiplexer switching during sampling. On-board SRAM stores different gain values for each channel. This combination lets you perform multi-channel high-speed sampling (up to 100 kHz) with different gains for each channel and DMA data transfer.

#### Unique Technology

PCL-818 cards share a custom-designed 160-pin ASIC chip that has a gate count of over 7,000 and utilizes 1.0 mm CMOS technology. This custom integration gives higher performance and reliability with lower power consumption on a smaller board.

#### Wide Selection with Migration Path

The PCL-818 series lets you choose the card that exactly matches your application and price range. The PCL-818L is designed for lower budgets, with the best price/performance ratio in the market. If you need more power, you can easily upgrade to any other card in the series.

### Specifications

#### Analog Input

- **Channels** 16 single-ended or 8 differential
- **Resolution** 12 bits
- **Input Range Selection** Software controlled
- **Auto Channel/Gain Scanning**
- **Triggering** Software, pacer or external
- **Data Transfer** Program control, interrupt (IRQ 2 ~ 7) or DMA (Ch. 1 or 3)
- **Input Impedance** 10 M $\Omega$
- **Input Overvoltage**  $\pm 30 V_{DC}$  max.

#### Analog Output (D/A Converter)

- **Channels** One 12-bit (double-buffered)
- **Output Range** 0 ~ +5 V or 0 ~ +10 V with internal reference  
0 ~ +10 V or 0 ~ -10 V with external reference

#### Digital Input/Output

- **Channels** 16 inputs, 16 outputs (all TTL compatible)
- **Input Voltage** Low (0 ~ +0.8 V)  
High (min. +2.0 V)
- **Input Load** Low: +0.5 V @ 0.4 mA max.  
High: +2.7 V @ 0.05 mA max.
- **Output Voltage** Low: 0 ~ +0.4 V  
High: min. +2.4 V
- **Driving Capacity** Low: (sink) 8 mA @ 0.5 V max.  
High: (source) -0.4 mA @ 2.4 V min.

#### A/D Pacer and Counter (8254)

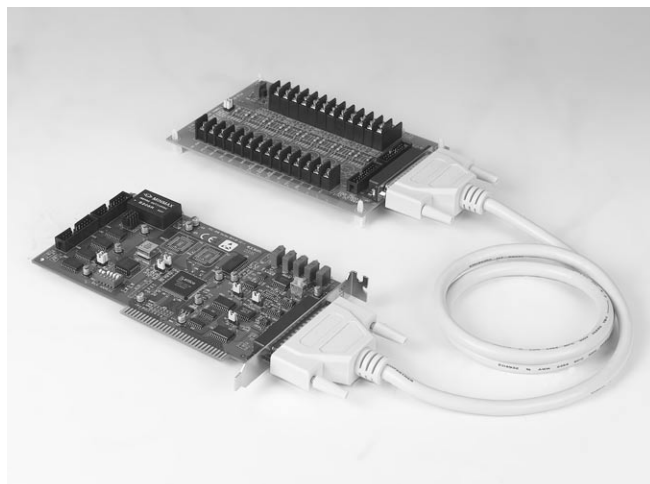
- **A/D Pacer** 32-bit with 10 MHz or 1 MHz time base
- **Max. and Min. Rates** 2.5 MHz to 0.00023 Hz
- **Counter** One 16-bit counter with 100 KHz time base

#### General

- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

# PCL-818L

## 40 kHz Multifunction Card



CE

### Features

#### PCL-818L

- 16 single-ended or 8 differential analog inputs
- 40 kHz 12-bit A/D converter
- Programmable gain for each input channel (up to 8)
- Automatic channel/gain scanning with DMA
- 16 digital inputs and 16 digital outputs

#### PCL-818LS

- Low cost package of PCL-818L with PCLD-8115 and PCL-10137

### Introduction

The PCL-818L is the entry-level model in the PCL-818 series. We designed it with the cost-sensitive customer in mind. It offers the same functions as the rest of the series, except that it has a 40 kHz sampling rate and only accepts bipolar inputs. It is fully software and connector compatible with the PCL-818HD and PCL-818HG. This lets you upgrade your applications to these higher performance cards without hardware or software changes.

#### The PCL-818LS Bundle

The PCL-818LS bundle consists of the PCL-818L card, the PCLD-8115 wiring terminal board and a DB37 cable assembly. The PCLD-8115 accommodates on-board passive signal conditioning components (resistors and capacitors), allowing you to easily implement a low-pass filter, a voltage attenuator or a 4 – 20 mA voltage converter.

### Specifications

#### Analog Input

- **Input Range (V)** Bipolar:  $\pm 10$ ,  $\pm 5$ ,  $\pm 2.5$ ,  $\pm 1.25$ ,  $\pm 0.625$
- **Maximum Sampling Rate** 40 kS/s for all input ranges
- **Accuracy**

Gain = 0.5, 1	0.01% of FSR $\pm 1$ LSB
Gain = 2, 4	0.02% of FSR $\pm 1$ LSB
Gain = 8	0.04% of FSR $\pm 1$ LSB

#### General

- **Power Consumption**

+5 V @ 210 mA typical, 500 mA max.
+12 V @ 20 mA typical, 100 mA max.
-12 V @ 20 mA typical, 40 mA max.
- **I/O Ports** 16 consecutive bytes
- **A/D, D/A Connector** DB37
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")

### Ordering Information

- **PCL-818L** Low-cost high-performance half-size multi-function card, user's manual and driver CD-ROM.(cable not included)
- **PCL-818LS** PCL-818L with PCLD-8115 and DB-37 cable assembly (PCL-10137-1)
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-8115** Industrial Wiring Terminal with CJC circuit and DB37 connector
- **PCLD-880** Industrial Wiring Terminal with DB37 connector

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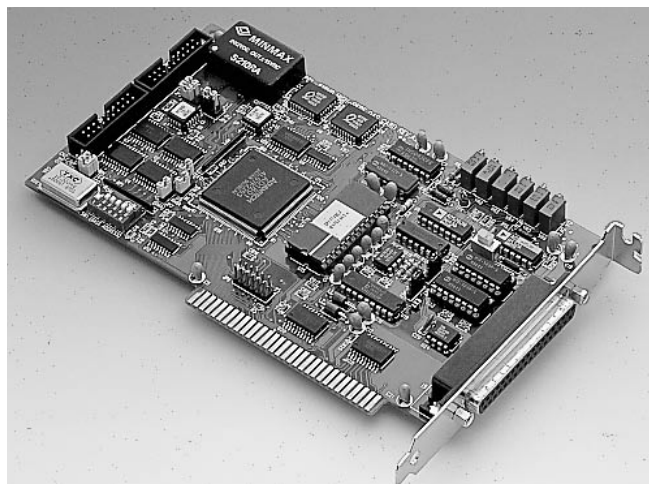
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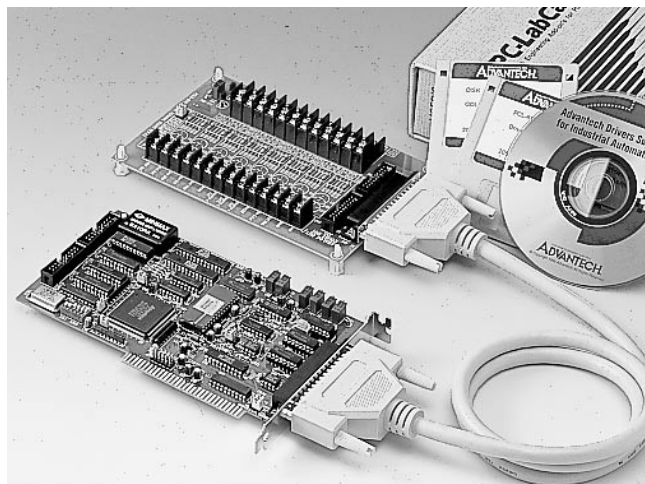
# PCL-818HD PCL-818HG

## High-Performance Half-Size Multifunction Card

## High-Performance Multifunction Card



PCL-818HD



PCL-818HG



## Introduction

The PCL-818HD has guaranteed 100 kHz sampling and transfer speeds at all gains (x 1, 2, 4 or 8, programmable) and input ranges. It features an onboard 1 K sample FIFO (First In First Out) buffer for faster data transfer and more predictable performance under Windows.

## Specifications

### Analog Input

- **Input Range (V)** Bipolar:  $\pm 10, \pm 5, \pm 2.5, \pm 1.25, \pm 0.625$   
Unipolar: 0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
- **Maximum Sampling Rate** 100 kHz for all input ranges
- **Accuracy**

Gain = 0.5, 1	0.01% of FSR $\pm 1$ LSB
Gain = 2, 4	0.02% of FSR $\pm 1$ LSB
Gain = 8	0.04% of FSR $\pm 1$ LSB

### General

- **On-board Memory** 1K samples FIFO for A/D. Can generate an interrupt when full or half full
- **Power Consumption** +5 V @ 500 mA max., +12 V @ 200 mA max
- **I/O Ports** 32 bytes with FIFO active or 16 bytes with FIFO disabled
- **A/D, D/A Connector** DB37
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

## Ordering Information

- **PCL-818HD** High-performance half-size multifunction card with DB-37 connector, user's manual and driver CD-ROM (cable not included)
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-8115** Industrial Wiring Terminal with CJC circuit and DB37 connector
- **PCLD-880** Industrial Wiring Terminal with DB37 connector

## Introduction

The PCL-818HG offers the same functions as the PCL-818HD, but it features a special high-gain programmable instrument amplifier for reading very low level input signals (x 0.5, 1, 5, 10, 50, 100, 500 or 1000).

The PCL-818HG package includes a special wiring board (PCLD-8115) with a DB-37 connector and CJC. This combination lets you measure low-level thermocouple signals without an external signal-conditioning board.

## Specifications

### Analog Input

- **Conversion Time** 8  $\mu$ sec.
- **Input Range (V)** Bipolar:  $\pm 10, \pm 5, \pm 1, \pm 0.5, \pm 0.1, \pm 0.05, \pm 0.01, \pm 0.005$   
Unipolar: 0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01
- **Maximum Sampling Rate** (depends on input amplifier settling time and slew rate)

Gain	Speed	Channels
0.5, 1	100 kHz	Single (input signal $\geq 3$ V p-p)
0.5, 1, 5, 10	35 kHz	Multiple
50, 100	7 kHz	Multiple
500, 1000	1 kHz	Multiple
- **Accuracy**

Gain = 0.5, 1	0.01% of FSR $\pm 1$ LSB
Gain = 5, 10	0.02% of FSR $\pm 1$ LSB
Gain = 50, 100	0.04% of FSR $\pm 1$ LSB
Gain = 500, 1000	0.08% of FSR $\pm 1$ LSB

### General

See PCL-818HD

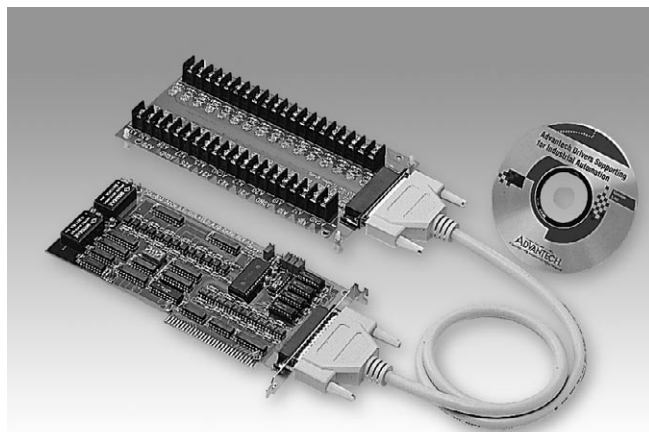
## Ordering Information

- **PCL-818HG** High-performance and High-gain multifunction card
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-8115** Industrial Wiring Terminal with CJC circuit and DB37 connector
- **PCLD-880** Industrial Wiring Terminal with DB37 connector



# PCL-813B

## 32-ch S.E. Isolated Analog Input Card



PCL-813B

PCLD-881

PCL-10137



### Features

- 32 single-ended analog input channels
- Over 500 V<sub>DC</sub> isolation
- 12-bit successive approximation A/D converter
- Analog input ranges (V):  $\pm 5$ ,  $\pm 2.5$ ,  $\pm 1.25$ ,  $\pm 0.625$ , 0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
- Program-controlled A/D trigger and data transfer

### Introduction

The PCL-813B is a 12-bit 32-channel A/D card which offers high-voltage isolation on each analog input. The PCL-813B is an extremely cost effective solution for applications in industrial measurement and monitoring. The card offers 32 A/D channels with software programmable gain on each channel and two DC-to-DC converters on a 4-layer PCB with an integral ground plane. Optically-isolated inputs provide over 500 V<sub>DC</sub> of isolation between the analog inputs and the PC, protecting the PC and peripherals from damage due to high voltages on the input lines. The PCL-813B is ideal for situations where the budget-conscious user requires flexibility, stability and a high level of isolation protection. The PCL-813B comes with the PCLD-881 wiring terminal board and a DB-37 cable assembly.

### Specifications

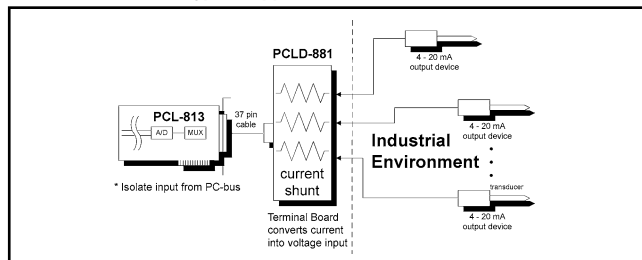
#### Input

- Channels** 32 single-ended with isolation
- Resolution** 12 bits, SAR
- Input Ranges** Bipolar:  $\pm 5$  V,  $\pm 2.5$  V,  $\pm 1.25$  V,  $\pm 0.625$  V (software programmable)  
Unipolar: 0 ~ 10 V, 0 ~ 5 V, 0 ~ 2.5 V, 0 ~ 1.25 V (jumper selectable)
- Over Voltage** Continuous  $\pm 30$  V (max.)
- Converter** AD574 (or equivalent) w/25  $\mu$ sec. conversion time
- Data Transfer Rate** 25 kHz maximum, software control only
- Offset Error** 0 ~ 5 V:  $\pm 1$  LSB  
 $\pm 5$  V, 0 ~ 10 V:  $\pm 2$  LSB
- Accuracy** 0.01% of reading  $\pm 1$  LSB
- Isolation Voltage** > 500 V<sub>DC</sub> from analog input to PC
- Trigger Mode** software trigger
- Input Impedance** > 10 M $\Omega$
- Temperature Coefficient**  $\pm 25$  PPM/ $^{\circ}$  C

#### General

- Power Consumption** +5 V @ 660 mA max.  
+12 V @ 140 mA max.
- Operating Temperature** 0 ~ 50 $^{\circ}$  C (32 ~ 122 $^{\circ}$  F)
- Storage Temperature** -20 ~ 65 $^{\circ}$  C (-4 ~ 149 $^{\circ}$  F)
- Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- I/O Connector** DB37 female connector for input port
- Dimensions (L x H)** 219 x 100 mm (8.6" x 3.9")

#### Typical application for PCL-813B:



#### Industrial 4 ~ 20 mA Output Device Monitoring

### Ordering Information

- PCL-813B** 32-ch. isolated analog input card, PCLD-881B wiring terminal board, DB-37 cable assembly, manual and driver CD-ROM.
- PCLD-881B** Industrial terminal board for PCI-1713 & PCL-813B
- PCL-10137-1** DB37 cable assembly, 1m
- PCL-10137-2** DB37 cable assembly, 2m
- PCL-10137-3** DB37 cable assembly, 3m
- ADAM-3937** DB37 wiring terminal for DIN-rail mounting

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

9  
Motion Control

10  
ICOM

11  
eConnectivity

12  
UNO

13  
ADAM-4000

14  
ADAM-5000

15  
ADAM-6000

16  
ADAM-8000

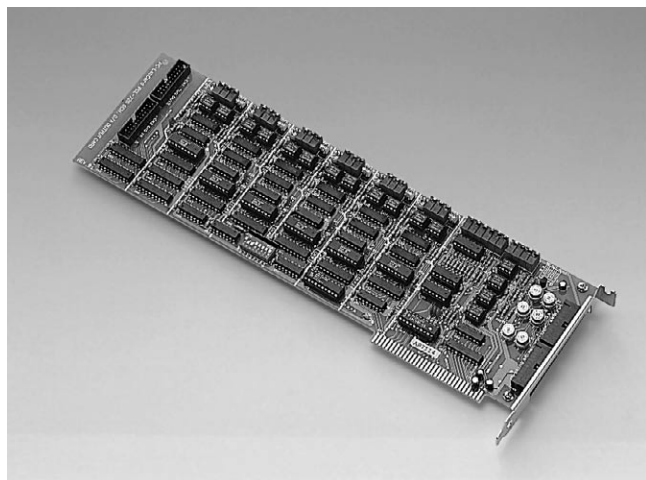
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# PCL-726 PCL-727 PCL-728

6-ch Digital Analog Output Card

12-ch Digital Analog Output Card

6-ch Analog Output Card



CE

## Features

- 6 independent analog output channels
- 12-bit resolution double-buffered D/A converter
- Multiple voltage ranges:  $\pm 10$  V,  $\pm 5$  V,  $0 \sim +5$  V,  $0 \sim +10$  V and  $4 \sim 20$  mA current loop (sink)
- 16 digital input channels and 16 digital output channels

## Introduction

The PCL-726 provides six 12-bit D/A channels on a full-size add-on card. You can individually configure each channel to any of the following ranges:  $0$  to  $+5$  V,  $0$  to  $+10$  V,  $\pm 5$  V,  $\pm 10$  V and  $4$  to  $20$  mA current loop (sink). Designed for use in industrial environments, the PCL-726 is an ideal, economical solution for applications that require multiple analog outputs or current loops.

In addition to its analog outputs, the PCL-726 also provides 16 digital output channels plus 16 digital input channels. Its TTL-compatible D/I and D/O ports easily interface with our line of daughterboards for industrial On/Off control and sensing applications.

## Specifications

### Analog Output (D/A Converter)

- **Channels** 6
- **Resolution** 12 bits, double buffered
- **Output Ranges** Unipolar:  $0 \sim +5$  V,  $0 \sim +10$  V  
Bipolar:  $\pm 5$  V,  $\pm 10$  V  
Current loop (sink):  $4 \sim 20$  mA,  $\pm 10$  V with external DC or AC reference
- **Throughput** 15 kHz
- **Settling Time**  $\leq 70$   $\mu$ s
- **Accuracy**  $\pm 0.012\%$  full scale range
- **Temperature Drift:** 5 PPM/ $^{\circ}$  C ( $0^{\circ} \sim 50^{\circ}$  C)
- **Linearity**  $\pm 1/2$  bit
- **Voltage Output Current**  $\pm 5$  mA max.
- **Current Loop Excitation Voltage** Minimum  $+8$  V, maximum  $+36$  V for  $4 \sim 20$  Voltage mA current loop
- **Reset (Power-on) Status** all D/A channels will be at  $0$  V output after reset or power-on (both bipolar and unipolar modes)

### Digital Input

- **Channels** 16-ch TTL compatible DI
- **Logic Level 0**  $0.8$  V max.
- **Logic Level 1**  $2.0$  V min.
- **Input Loading**  $0.5$  V @  $0.4$  mA max. (low)  
 $2.7$  V @  $50$  mA max. (high)

### Digital Output

- **Channel** 16-ch TTL compatible DO
- **Logic Level 0**  $0.5$  V @  $8.0$  mA (sink)
- **Logic Level 1**  $2.4$  V @  $0.05$  mA (source)

### General

- **Power Consumption**  $+5$  V @  $500$  mA typical,  $1$  A max.  
 $+12$  V @  $80$  mA typical,  $110$  mA max.  
 $-12$  V @  $60$  mA typical,  $90$  mA max.
- **Operating Temperature**  $0 \sim 50^{\circ}$  C ( $32 \sim 122^{\circ}$  F)
- **Storage Temperature**  $0 \sim 65^{\circ}$  C ( $32 \sim 149^{\circ}$  F)
- **Operating Humidity**  $5\% \sim 95\%$  RH non-condensing (refer to IEC 68-2-3)
- **Connectors** One 37-pin D type female connector  
Two 20-pin male ribbon cable connectors
- **Dimensions (LxH)**  $340 \times 100$  mm ( $13.4" \times 3.9"$ )

## Ordering Information

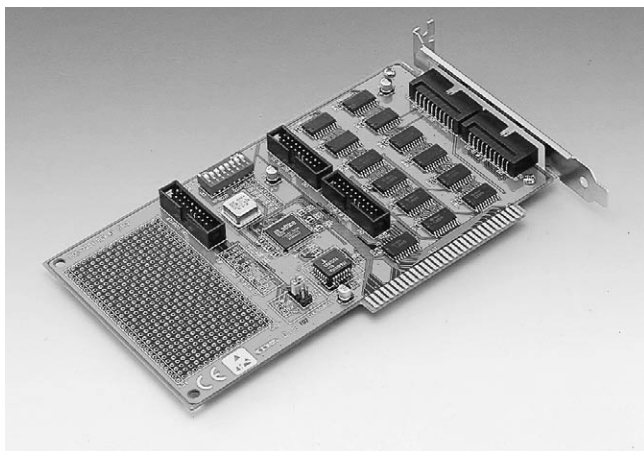
- **PCL-726** 6-channel D/A output and DIO card, user's manual and driver CD-ROM (cable not included)
- **PCL-727** 6-ch Digital Analog Output Card
- **PCL-728** 12-ch Digital Analog Output Card
- **PCL-10120-1** 20-pin flat cable, 1 m
- **PCL-10120-2** 20-pin flat cable, 2 m
- **PCLD-780** Screw terminal board
- **PCLD-782** Opto-Isolated D/I board (16-ch)
- **PCLD-785** Relay output board (16-ch)
- **ADAM-3920** 20-pin wiring terminal for DIN-rail mounting

## Applications

- PID loop control
- Programmable voltage source
- Servo control
- Programmable current sink
- Function generator

# PCL-720+

## Digital I/O and Counter Card



### Features

- 32 TTL-level digital input channels
- 32 TTL-level digital output channels
- High-output driving capacity
- Low-input loading
- 3 programmable counter/timer channels
- User configurable clock source
- Breadboard area for custom circuits

### Introduction

The PCL-720+ digital I/O and counter card is a PC-compatible add-on card with 32 digital input channels, 32 digital output channels and three programmable counter/timer channels. Its digital I/O channels are TTL-compatible and use 74LS244 driver/buffer circuits to provide high output driving capacity. These buffered circuits also require lower input loading current than regular TTL circuits. The PCL-720+'s 8254 programmable counter/timer provides three flexible 16-bit counter/timer channels. You can generate waves and pulses by programming the 8254. Jumper settings determine the clock crystal frequency. The PCL-720+ also includes a breadboard area perfect for customized circuits.

### Specifications

#### Digital Input

- **Input Lines** 32
- **Logic Level 0** 0.8 V max.
- **Logic Level 1** 2.0 V min.

#### Digital Output

- **Output Lines** 32
- **Logic Level 0** 0.5 V max. @ 24 mA (sink)
- **Logic Level 1** 2.0 V min. @ 15 mA (source)

#### Programmable Counter/Timer

- **Frequency Range** 0 ~ 2.6 MHz
- **Counters** 3 independent 16-bit counters
- **Modes** 6 programmable modes
- **Usable Pins** CLOCK and GATE for each channel

#### Clock Source

- **Clock Frequency** 2 MHz, 1 MHz, 500 kHz or 250 kHz; jumper selectable
- **Frequency Divider** Divided by 1, 10, 100 or user adjustable

#### General

- **I/O Port Address** Eight consecutive bytes from hex 200 ~ 3F8
- **Breadboard Area** 540 (30 x 18) plated-through "donuts", each with a .036" hole on 0.10" centers. Further, provide +5 V on the left side, and provide GND on the right side
- **Power Consumption** +5 V @ 500 mA typical
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Connectors** Five 20-pin male ribbon-cable connectors
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 4")

### Ordering Information

- **PCL-720** Digital I/O and counter card, user's manual, user's manual and driver CD-ROM (cable not included)
- **PCL-10120-1** 20-pin flat cable, 1 m
- **PCL-10120-2** 20-pin flat cable, 2 m
- **PCLD-780** Screw terminal board
- **PCLD-782** 24/16 Channel opto-isolated D/I board
- **PCLD-785** 24/16 Channel relay output board
- **PCLD-786** SSR and relay driver board
- **PCLD-885** 16-Channel power relay (form A) output board
- **ADAM-3920** 20-pin flat cable wiring terminal for DIN-rail mounting

### Applications

#### Digital Input

- Contact-closure monitoring
- Switch-panel status sensor
- BCD interface receiver
- Digital signal interface

#### Digital Output

- Industrial on/off controller
- Digital signal interface
- BCD interface driver

#### Counter/Timer

- Period and pulse-width measurement
- Event and frequency counting
- Waveform and pulse generation

1

Software

2

IPPC

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TPC

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FPM

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ATM & AWS

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DA&C

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cPCI

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ADAM-3000

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Motion Control

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ICOM

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eConnectivity

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UNO

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ADAM-4000

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ADAM-5000

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ADAM-6000

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ADAM-8000

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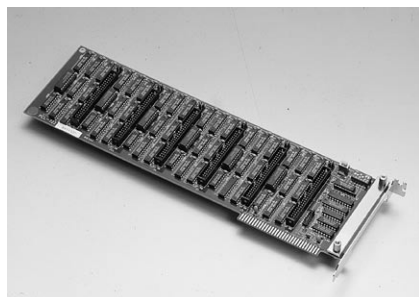
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# PCL-722 PCL-724 PCL-731

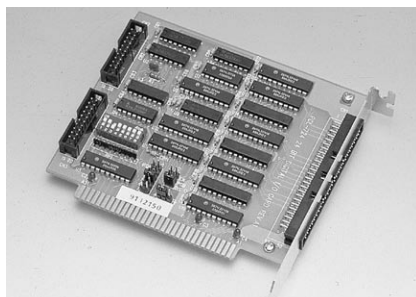
144-bit Digital I/O Card

24-bit Digital I/O Card

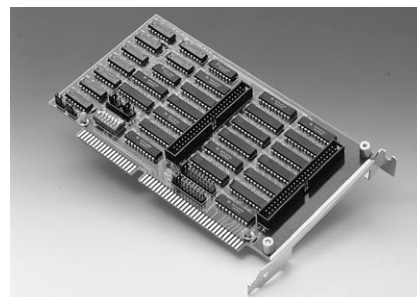
48-bit Digital I/O Card



PCL-722



PCL-724



PCL-731

## Features

- Emulates 8255 PPI mode 0
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handing
- Output status readback
- Pin compatible with Opto-22 I/O module racks

## Specifications

- I/O Lines** 144 (24 bits x 6 ports)
- Programming Mode** 8255 PPI mode 0
- Interrupts** bits 0 and 3 of Port C can generate an interrupt to IRQ 2, 3, 4, 5, 6 or 7

### Digital output

- Port A and Port B** Logic 0: 0.4 V max. @ 12 mA (sink)  
Logic 1: 2.4 V min. @ 8.0 mA (source)
- Port C** Logic 0: 0.5 V max. @ 24 mA (sink)  
Logic 1: 2.0 V min. @ 15 mA (source)

### Digital input

- Port A and Port B** Logic Level 0: 0.8 V max.  
Logic Level 1: 2.0 V min.
- Port C** Logic Level 0: 0.8 V max.  
Logic Level 1: 2.0 V min.

### General

- Power Consumption** +5 V @ 1.3 A typical  
+5 V @ 1.8 A max.
- Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Connectors** Six 50-pin male ribbon-cable connectors. Pin assignments are fully compatible with Opto-22 I/O module racks
- Dimensions (L x H)** 334 x 100 mm (13.2" x 3.9")

## Specifications

- I/O Lines** 24
- Programming Mode** 8255 PPI mode 0
- Interrupt** Bit 0 of one port can generate an interrupt to IRQ2 ~ 7
- Interrupt Triggering** Rising or falling edge triggering, jumper-selectable
- Digital Output** Logic 0: 0.4 V max. @ 24 mA (sink)  
Logic 1: 2.4 V min. @ 15 mA (source)
- Digital Input** Logic 0: 0.4 V max.  
Logic 1: 2.4 V min.

### General

- Power Consumption** +5 V @ 0.5 A (typical)  
+5 V @ 0.8 A (max.)
- Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Connectors** 50-pin male ribbon-cable connector
- Dimensions (L x H)** 125 x 100 mm (4.9" x 3.9")

## Pin Assignments

PC 7	1	2	GND
PC 6	3	4	GND
PC 5	5	6	GND
PC 4	7	8	GND
PC 3	9	10	GND
PC 2	11	12	GND
PC 1	13	14	GND
PC 0	15	16	GND
PB 7	17	18	GND
PB 6	19	20	GND
PB 5	21	22	GND
PB 4	23	24	GND
PB 3	25	26	GND
PB 2	27	28	GND
PB 1	29	30	GND
PB 0	31	32	GND
PA 7	33	34	GND
PA 6	35	36	GND
PA 5	37	38	GND
PA 4	39	40	GND
PA 3	41	42	GND
PA 2	43	44	GND
PA 1	45	46	GND
PA 0	47	48	GND
+5 V	49	50	GND

## Specifications

- I/O Lines** 48
- Programming Mode** 8255 PPI mode 0
- Interrupt** Bit 0 of one port can generate an interrupt to IRQ 2~15
- Interrupt Triggering** Rising or falling edge triggering, jumper-selectable
- Digital Output** Logic 0: 0.4 V max. @ 24 mA (sink)  
Logic 1: 2.4 V min. @ 15 mA (source)
- Digital Input** Logic 0: 0.4 V max.  
Logic 1: 2.4 V min.

### General

- Power Consumption** +5 V @ 0.5 A typical  
+5 V @ 0.8 A max.
- Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- Connectors** Two 50-pin male ribbon-cable connectors
- Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

## Ordering Information

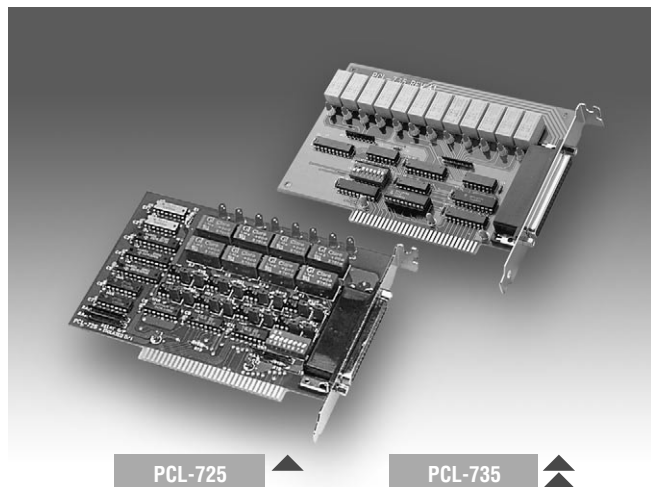
- PCL-722** 144-bit digital I/O card, user's manual and driver CD-ROM (cable not included)
- PCL-724** 24-bit digital I/O card, user's manual and driver CD-ROM (cable not included)
- PCL-731** 48-bit digital I/O card, user's manual and driver CD-ROM (cable not included)
- PCL-10150-1.2** 50-pin flat cable, 1.2 m
- PCLD-782B** 24/16-ch. opto-isolated digital input board
- PCLD-785B** 24/16-ch. relay output board
- PCLD-7216** 16-ch. carrier board for SSR I/O modules
- PCLD-885** 16-ch. power relay (Form A) output board
- ADAM-3950** 50-pin flat cable wiring terminal for DIN-rail mounting



# PCL-725 PCL-735

## Relay Actuator and Isolated Digital Input Card

### 12-ch Relay Actuator Card



PCL-725

PCL-735



## Introduction

PCL-735 is a relay actuator card, while PCL-725 is combination of a relay actuator and isolated digital input card. Both half-size cards provide electromechanical SPDT relays. An on-board DB-37 connector provides access to all input and output channels.

## Specifications

### PCL-725

#### Isolated Digital Input

- **Input Channels** 8
- **Opto-Isolator** 4N25
- **Input Voltage** 5 ~ 24 V
- **Input Resistance** 560  $\Omega$  (1 W @ 24 V input)
- **Input Buffers** Voltage comparators
- **Threshold Voltage** 1.5 V<sub>DC</sub>, adjustable
- **Breakdown Voltage** 300 V<sub>DC</sub>
- **Throughput** 10 kHz (max)

#### Relay Output

- **Output Channels** 8
- **Relay Type** Single-pole double-throw (SPDT, Form C)
- **Output Type** CH0 ~ CH3 with Normally Open and Normally Closed, CH4 ~ CH7 with Normally Open only
- **Contact Rating** 120 V<sub>AC</sub> @ 0.5 A or 30 V<sub>DC</sub> @ 1 A
- **Breakdown Voltage** 300 V AC/DC min.
- **Relay on Time** 5 ms. typical
- **Relay off Time** 5 ms. typical
- **Total Switching Time** 10 ms. typical
- **Insulation Resistance** 100 M $\Omega$  min.
- **Life Expectancy** > 5 x 10<sup>6</sup> operations at AC: 110 V/0.3 A, DC: 24 V/1.25 A
- **Relay Driver** + 12 V @ 33 mA for each relay

#### General

- **Power Consumption** +5 V @ < 0.2 A; +12 V @ 33 mA for each relay, < 0.27 A if all eight relays are energized
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **I/O Port Address** Two consecutive bytes from hex 200 ~ 3F8
- **Connector** 37-pin D-type female connector
- **Dimensions (L x H)** 147 x 100 mm (5.75" x 3.9")

## Features

### PCL-725

- 8 relay outputs
- 8 optically-isolated digital inputs
- LED relay status indicators
- Isolated or non-isolated digital inputs
- Male DB37 matching connector included

### PCL-735

- 12 relay outputs
- LED relay status indicators
- Male DB37 matching connector included
- Relay status readback function

### PCL-735

#### Relay Output

- **Relay Type** Single-pole double-throw (SPDT, Form C)
- **Output Type** Ch0 to Ch11, normally open/normally closed
- **Contact Rating** 2 A @ 30 V<sub>DC</sub>, 1 A @ 125 V<sub>AC</sub>
- **Breakdown Voltage** 1,000 V<sub>AC/DC</sub> min.
- **Relay on Time** 5 ms. typical
- **Relay off Time** 5 ms. typical
- **Total Switching Time** 10 ms. typical
- **Insulation Resistance** 1,000 M $\Omega$  @ 500 V<sub>DC</sub> min.
- **Life Expectancy** > 5 x 10<sup>6</sup> operations @ 30 V<sub>DC</sub> and 2 A  
> 2 x 10<sup>6</sup> operations @ 30 V<sub>DC</sub> and 1 A

#### General

- **Power Consumption** +5 V @ 280 mA (typical)  
+12 V @ 200 mA (max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Connector** One 37-pin D-type female connector
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **I/O Port Address** Two consecutive bytes from hex 200 ~ 3F8
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")

## Ordering Information

- **PCL-725** Relay actuator and isolated D/I Card, user's manual, driver CD-ROM and one DB-37 male connector (P/N: PCL-10437-0)
- **PCL-735** 12-channel relay actuator card, user's manual, driver CD-ROM and one DB-37 male connector (P/N: PCL-10437-0)
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-880** Screw terminal board
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

1  
Software

2  
IPPC

3  
TPC

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FPM

5  
ATM & AWS

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DA&C

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cPCI

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ADAM-3000

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Motion Control

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ICOM

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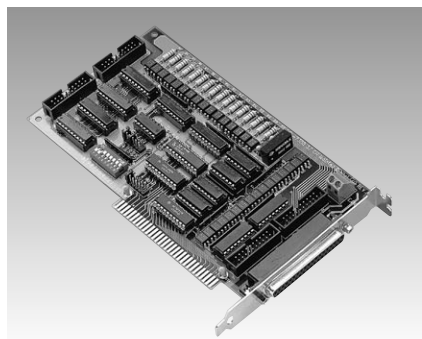


# PCL-730 PCL-733 PCL-734

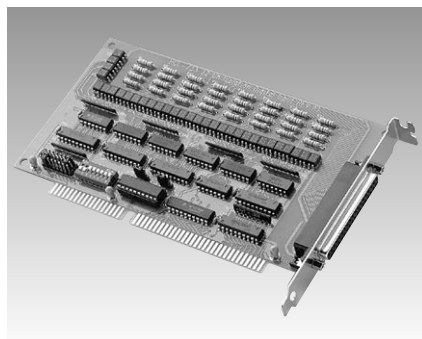
## 32-ch. Isolated Digital I/O Card

## 32-ch. Isolated Digital Input Card

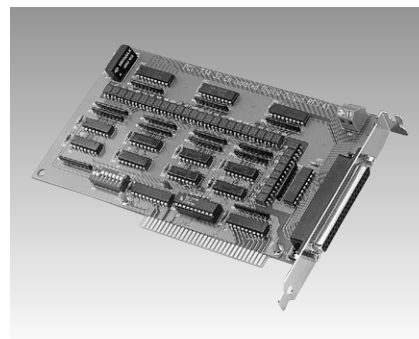
## 32-ch. Isolated Digital Output Card



PCL-730



PCL-733



PCL-734



### Features

- 32 isolated DIO channels (16 inputs and 16 outputs)
- 32 TTL-level DIO channels (16 inputs and 16 outputs)
- High output driving capacity
- High-voltage isolation on isolated I/O channels (2,500 V<sub>DC</sub>)
- Interrupt capability
- Two 20-pin connectors for isolated digital I/O channels and two for TTL digital I/O channels
- D-type connector for isolated input and output channels

### Features

- 32 isolated, bidirectional digital input channels
- High-voltage isolation (2,500 V<sub>DC</sub>)
- Interrupt capacity
- D-type connectors for isolated input channels
- Reverse voltage protection for isolated input channels (up to 24 V<sub>DC</sub>)

### Features

- 32 isolated digital output channels
- High output driving capacity
- High-voltage isolation on output channels (1,000 V<sub>DC</sub>)
- High sink current on isolated output channels (200 mA/channel)
- Integral suppression diodes for inductive loads
- Wide output range (5 ~ 40 V<sub>DC</sub>)
- D-type connectors for isolated output channels

### Introduction

The PCL-730/733/734 cards offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V<sub>DC</sub>, which makes it ideal for industrial applications where high-voltage isolation is required. In addition, all output channels are provide high-voltage protection.

### Specifications

#### Isolated Digital Input

	PCL-730	PCL-733
Input Channels	16 (16-ch/group)	32 (16-ch/group)
Interrupt Inputs	2 (IDIO, IDI1)	2 (IDIO, IDI16)
Interrupt Level	2 ~ 7	2, 3, 5, 7, 10, 11, 12, 15
Input Voltage	5 ~ 24 V <sub>DC</sub>	
Input Resistance	1.2 kΩ @ 0.5 W	
Optical Isolation	2,500 V <sub>DC</sub>	

#### Isolated Digital Output

	PCL-730	PCL-734
Output Channels	16 (16-ch/group)	32 (16-ch/group)
Optical Isolation	2,500 V <sub>DC</sub>	1,000 V <sub>DC</sub>
Throughput	10 kHz	
Supply Voltage	5 ~ 40 V <sub>DC</sub>	
Sink Current	200 mA max./channel	

#### General

		PCL-730	PCL-733	PCL-734
I/O Connector Type		37-pin D-type female		
Dimensions (L x H)		185 x 100 mm (7.3" x 3.9")		
Power Consumption	Typical	+5 V @ 330 mA	+5 V @ 320 mA	+5 V @ 330 mA
	Max.	+5 V @ 500 mA	+5 V @ 500 mA	+5 V @ 500 mA
Temperature	Operating	0 ~ 60° C (32 ~ 140° F)		
	Storage	-20 ~ 70° C (-4 ~ 158° F)		
Relative Humidity		5 ~ 95% RH non-condensing (refer to IEC 68-2-3)		

**Note:** The PCL-730 also provides 16-ch TTL Digital Input and 16-ch TTL Digital Output. Please refer to the PCL-730 User's Manual for the detail information.

### Ordering Information

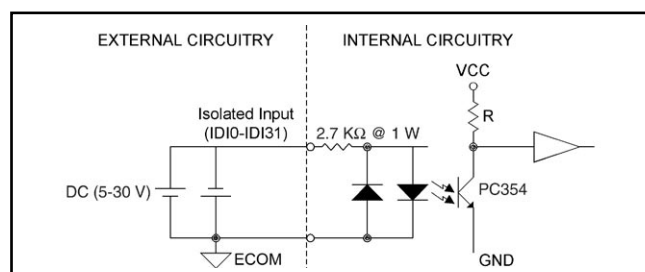
- PCL-730** 32-channel isolated digital I/O card, user's manual and driver CD-ROM (cable not included)
- PCL-733** 32-channel isolated digital input card, user's manual and driver CD-ROM (cable not included)
- PCL-734** 32-channel isolated digital output card, user's manual and driver CD-ROM (cable not included)
- PCL-10120-1** 20-pin flat cable, 1 m (for PCL-730 only)
- PCL-10120-2** 20-pin flat cable, 2 m (for PCL-730 only)

# PCL-730 PCL-733 PCL-734

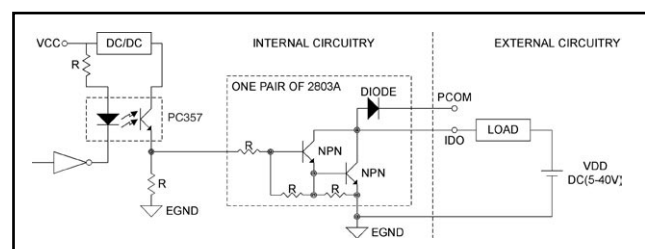
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m
- **PCLD-782** 16-channel opto-isolated D/I board (for PCL-730 only)
- **PCLD-785** 16-channel relay output board (for PCL-730 only)
- **PCLD-786** 8-channel SSR I/O module carrier board (for PCL-730 only)
- **PCLD-885** 16-channel power relay (form A) output board (for PCL-730 only)
- **PCLD-780** Universal screw terminal board
- **PCLD-880** Universal screw terminal board
- **ADAM-3920** 20-pin flat cable wiring terminal for DIN-rail mounting (for PCL-730 only)
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

## Applications

- Industrial On/Off control
- Contact closure monitoring
- Switch status sensing
- BCD interfacing
- Digital input control
- Industrial and lab automation



Isolated Input Circuit Diagram



Isolated Output Circuit Diagram

## Pin Assignments

### CN1 of PCL-730

ID0 0	1	2	ID0 1
ID0 2	3	4	ID0 3
ID0 4	5	6	ID0 5
ID0 6	7	8	ID0 7
ID0 8	9	10	ID0 9
ID0 10	11	12	ID0 11
ID0 12	13	14	ID0 13
ID0 14	15	16	ID0 15
E.GND	17	18	E.GND
PCOM1/E.GND	19	20	PCOM2

### CN2 of PCL-730

ID1 0	1	2	ID1 1
ID1 2	3	4	ID1 3
ID1 4	5	6	ID1 5
ID1 6	7	8	ID1 7
ID1 8	9	10	ID1 9
ID1 10	11	12	ID1 11
ID1 12	13	14	ID1 13
ID1 14	15	16	ID1 15
EI.GND 1	17	18	EI.GND 2
EI.GND 1	19	20	EI.GND 2

### CN3 of PCL-730

DO 0	1	2	DO 1
DO 2	3	4	DO 3
DO 4	5	6	DO 5
DO 6	7	8	DO 7
DO 8	9	10	DO 9
DO 10	11	12	DO 11
DO 12	13	14	DO 13
DO 14	15	16	DO 15
D.GND	17	18	D.GND 2
+5V	19	20	+12V

### CN4 of PCL-730

DI 0	1	2	DI 1
DI 2	3	4	DI 3
DI 4	5	6	DI 5
DI 6	7	8	DI 7
DI 8	9	10	DI 9
DI 10	11	12	DI 11
DI 12	13	14	DI 13
DI 14	15	16	DI 15
D.GND	17	18	D.GND 2
+5V	19	20	+12V

### CN6 of PCL-730

ID10	1	20	ID11
ID12	2	21	ID13
ID14	3	22	ID15
ID16	4	23	ID17
ID18	5	24	ID19
ID110	6	25	ID111
ID112	7	26	ID113
ID114	8	27	ID115
EI.GND1	9	28	EI.GND2
PCOM1/E.GND	10	29	E.GND
ID00	11	30	ID01
ID02	12	31	ID03
ID04	13	32	ID05
ID06	14	33	ID07
ID08	15	34	ID09
ID010	16	35	ID011
ID012	17	36	ID013
ID014	18	37	ID015
PCOM2	19	37	

- DO** Digital output
- DI** Digital input
- IDO** Isolated digital output
- IDI** Isolated digital input
- E.GND** External ground for isolated output
- EI.GND** External common for isolated input
- D.GND** Digital ground
- PCOM** Free wheeling common diode

### CN1 of PCL-733

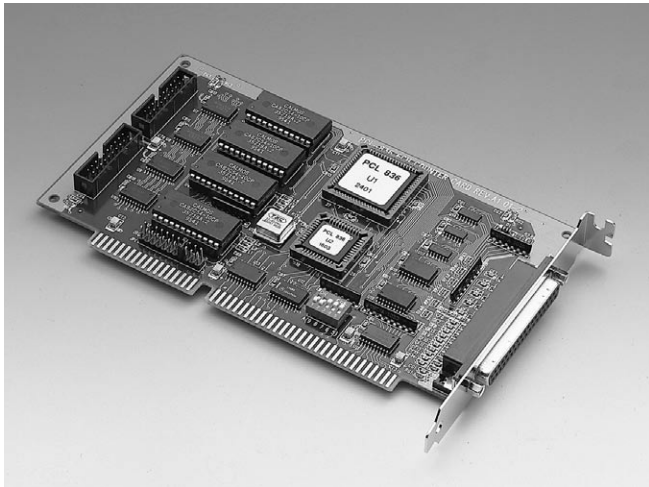
ID10	1	20	ID11
ID12	2	21	ID13
ID14	3	22	ID15
ID16	4	23	ID17
EI.GND1	5	24	ID18
ID19	6	25	ID110
ID111	7	26	ID112
ID113	8	27	ID114
ID115	9	28	EI.GND2
ID116	10	29	ID117
ID118	11	30	ID119
ID120	12	31	ID121
ID122	13	32	ID123
ID124	14	33	ID124
ID125	15	34	ID126
ID127	16	35	ID128
ID129	17	36	ID130
ID131	18	37	EI.GND4
NC	19	37	

### CN1 of PCL-734

ID00	1	20	ID01
ID02	2	21	ID03
ID04	3	22	ID05
ID06	4	23	ID07
PCOM1	5	24	ID08
ID09	6	25	ID010
ID011	7	26	ID012
ID013	8	27	ID014
ID015	9	28	PCOM2
ID016	10	29	ID017
ID018	11	30	ID019
ID020	12	31	ID021
ID022	13	32	ID023
PCOM3	14	33	ID024
ID025	15	34	ID026
ID027	16	35	ID028
ID029	17	36	ID030
ID031	18	37	PCOM4
E.GND	19	37	

# PCL-836

## 6-ch Counter/Timer Card



CE

### Features

- Periodic interrupt generation
- 6 independent 16-bit counters
- Digital filter for noise reduction
- Binary or BCD counting
- Programmable frequency output
- Complex duty-cycle output
- Single-shot output
- 16-bit TTL input and 16-bit TTL output ports
- Selectable interrupt input channel
- Up to 10 MHz input frequency
- Pulsewidth and period measurement
- Time-delay generation
- F/V conversion and accumulation

### Introduction

PCL-836 is a general purpose counter/timer and digital I/O card for PC/AT compatible computers. It provides six 16-bit counter channels. It also includes 16 digital outputs and 16 digital inputs. Two 8254 chips provide a variety of powerful counter/timer function modes to match your industrial and/or laboratory applications.

#### Unique Digital Filter

PCL-836 includes a unique digital filter to eliminate noise on the input signal. The frequency can be adjusted to provide more stable output readings.

### Specifications

#### Programmable Counter

- **Counter** Six independent 16-bit counter channels
- **Modes** Six programmable counter modes
- **Programmable Digital Noise Filter** 1.6 ms to 52 ms
- **3 PWM Output**
- **TTL Compatible Input/Output**
- **Interrupt** IRQ 2, 4, 5, 7, 10, 11, 12, 15 (jumper selectable)

#### Digital Input/Output

- **16 TTL Input Channels** Logic level 0: 0.8 V max.  
Logic level 1: 2.4 V min.
- **16 TTL Output Channels** Logic level 0: 0.5 V max. @ 8 mA  
Logic level 1: 2.4 V min. @ 0.4 mA

#### General

- **Power Consumption** +5 V @ 360 mA (typical)  
+5 V @ 400 mA (max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Connector** One 37-pin D-type female connector for counter I/O  
Two 20-pin male flat-cable connector for digital I/O
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

### Ordering Information

- **PCL-836** 6-channel counter/timer card, user's manual and driver CD-ROM (cable not included)
- **PCL-10137-1** DB37 cable assembly, 1m
- **PCL-10137-2** DB37 cable assembly, 2m
- **PCL-10137-3** DB37 cable assembly, 3m

- **PCLD-880** Screw terminal board
- **ADAM-3937** DB-37 wiring terminal for DIN-rail mounting

### Pin Assignments

CLK1	1	20	OUT1
GATE1	2	21	GND
CLK2	3	22	OUT2
GATE2	4	23	GND
CLK3	5	24	OUT3
GATE3	6	25	GND
CLK4	7	26	OUT4
GATE4	8	27	GND
CLK5	9	28	OUT5
GATE5	10	29	GND
CLK6	11	30	OUT6
GATE6	12	31	GND
Interrupt Input	13	32	Interrupt Enable
PWM1	14	33	PWM2
PWM3	15	34	GND
Fout1	16	35	Fout2
Fout3	17	36	Fout4
Fout5	18	37	Fout6
+5V	19		

### Applications

- Event counting
- Industrial automation (flowmeter/wattmeter monitoring)
- Programmable frequency synthesis
- Frequency counter

# PCM-3712 PCM-3718H/HG/HO PCM-3724

**2-ch. Analog Output Module  
12-bit Multifunction Module  
with Programmable Gain**

**48-ch Digital I/O Module**

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

7  
cPCI

8  
ADAM-3000

9  
Motion Control

10  
ICOM

11  
eConnectivity

12  
UNO

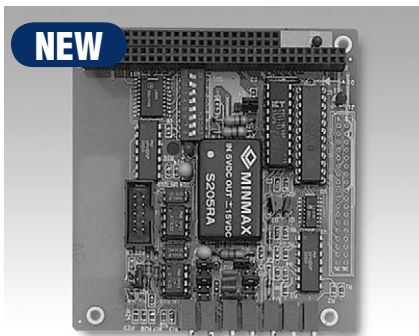
13  
ADAM-4000

14  
ADAM-5000

15  
ADAM-6000

16  
ADAM-8000

17  
BAS



**NEW**

PCM-3712

## Features

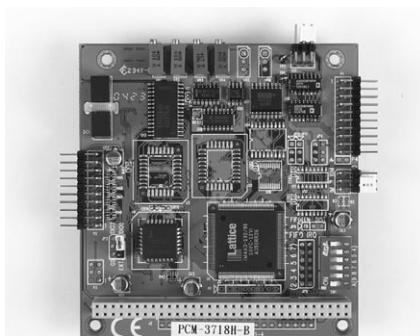
- 2 channels analog output module
- 0 to 5 V, 0 to 10 V, -2.5 V to +2.5 V, -5 V to +5 V, -10 V to +10 V, or 4 to 20 mA output range
- 12-bit resolution

## Specifications

- Analog Output Channels** 2
- Voltage Range Unipolar** 0 to 5 V, 0 to 10 V
- Bipolar**  $\pm 2.5$  V,  $\pm 5$  V,  $\pm 10$  V
- Current Range** 4 ~ 20 mA
- Output Current Range**  $\pm 5$  mA
- Impedance** 0.1 max./0.02 typ.
- Resolution** 12-bit
- Nonlinearity**  $\pm 1$  LSB
- Differential Nonlinearity**  $\pm 1/2$  LSB
- System Accuracy**  $\pm 0.025\%$  FSR (Voltage)  
 $\pm 0.05\%$  FSR (Current)
- Dynamic Performance** 5 V step: 16  $\mu$ s  
0.3 V/ $\mu$ s typ. (Voltage)  
1.2 mA/ $\mu$ s (Current)
- Settling Time to 1/2 LSB** 10 V step: 33  $\mu$ s
- Slew Rate** 0.3 V/ $\mu$ s typ. (Voltage)  
1.2 mA/ $\mu$ s (Current)
- D/A Converter Single Channel** 33 kHz bit resolution

## Ordering Information

- PCM-3712** 2-channel analog output module (18 cm Flat Cable 10-pin to DB9 (F) included)
- ADAM-3909** DB9 cable wiring for DIN-rail mounting



PCM-3718H/HG

## Features

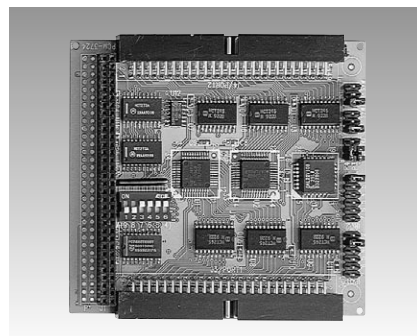
- 16 single-ended or 8 differential analog inputs
- 12-bit A/D converter, up to 100 KHz sampling rate with DMA transfer
- Two 8-bit digital input/output TTL level channels
- One 12-bit Analog output channel (PCM-3718HO only)

## Specifications

- Analog Input**
  - Channels** 16 single-ended or 8 differential inputs  
12 bits
  - Resolution** 12 bits
- Analog Output**
  - Channel** One 12-bit
  - Output Range** 0 ~ +5 V or 0 ~ +10 V with int. reference  
0 ~ +10 V or 0 ~ -10 V with ext. reference  
Bipolar:  $\pm 10$ ,  $\pm 5$ ,  $\pm 1$ ,  $\pm 0.5$ ,  $\pm 0.1$ ,  $\pm 0.05$ ,  $\pm 0.01$ ,  $\pm 0.005$   
Unipolar (PCM-3718HG): 0 ~ 10, 0 ~ 1, 0 ~, 0 ~ 0.01
  - Input Range** Two 8-bit TTL-level Digital I/O channels  
Logic 0: 0.8 V max.  
Logic 1: 2.0 V min.  
Logic 0: 0.33 V max. @ 6 mA (sink)  
Logic 1: 3.84 V min. @ 6 mA (source)  
+5 V,  $\pm 5\%$  tolerance on power supply  
Operating: 0 ~ 60° C (32 ~ 140° F)  
Storage: -40 ~ 85° C (-40 ~ 185° F)
- Digital Input/Output**
  - Channels** Two 8-bit TTL-level Digital I/O channels  
Logic 0: 0.8 V max.  
Logic 1: 2.0 V min.  
Logic 0: 0.33 V max. @ 6 mA (sink)  
Logic 1: 3.84 V min. @ 6 mA (source)  
+5 V,  $\pm 5\%$  tolerance on power supply  
Operating: 0 ~ 60° C (32 ~ 140° F)  
Storage: -40 ~ 85° C (-40 ~ 185° F)
  - Input Voltage** 0 ~ 5 V,  $\pm 5\%$  tolerance on power supply
  - Output Voltage** 0 ~ 5 V,  $\pm 5\%$  tolerance on power supply
  - Power Requirements** +5 V,  $\pm 5\%$  tolerance on power supply
  - Temperature** Operating: 0 ~ 60° C (32 ~ 140° F)  
Storage: -40 ~ 85° C (-40 ~ 185° F)

## Ordering Information

- PCM-3718H** 12-bit multifunction module with programmable gain (cable not included)
- PCM-3718HG** PCM-3718H w/high gain
- PCM-3718HO** PCM-3718H w/AO
- ADAM-3920** 20-pin flat cable wiring terminal for DIN-Rail mounting
- PCLD-780** Screw-terminal board for 20-pin flat cable
- PCL-10120-1** 20-pin flat cable, 1 m
- PCL-10120-2** 20-pin flat cable, 2 m



PCM-3724

## Features

- Output status read back
- Channels simulate 8255 PPI mode 0
- Interrupt triggering, rising/falling edge

## Specifications

- Digital I/O**
  - Channels** 48 digital I/O channels
  - Throughput** 300 kbps typical  
400 kbps max.
  - Input Voltage** Logic 0: 0.8 V max.  
Logic 1: 2.0 V min.
  - Output Voltage** Logic 0: 0.5 V max. @ 24 mA (sink)  
Logic 1: 2.0 V min. @ 15 mA (source)  
+5 V,  $\pm 5\%$  tolerance on power supply
  - Power Requirements** 96 x 90 mm (3.8"x 3.5"), 0.084 kg (0.185 lb)
  - Size/Weight** Operating: 0 ~ 60° C (32 ~ 140° F)  
Storage: -40 ~ 85° C (-40 ~ 185° F)
  - Temperature** 0 ~ 90% relative humidity, non-condensing
  - Operating Humidity**

## Ordering Information

- PCM-3724** 48-channel digital I/O module (cable not included)
- ADAM-3950** 50-pin flat cable wiring terminal for DIN-Rail mounting
- PCLD-785B** 24-channel relay output board
- PCLD-782B** 24-channel opto-isolated digital input board
- PCL-10150-1.2** 50-pin flat cable, 1.2 m

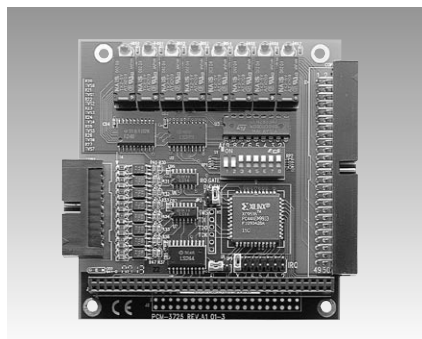


# PCM-3725 PCM-3730 PCM-3780

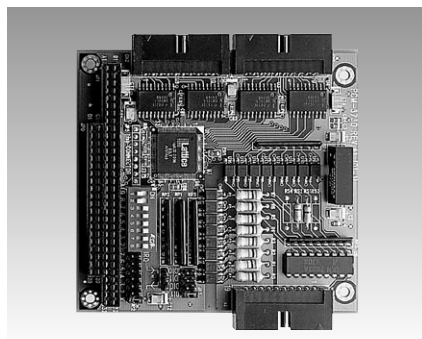
8-ch Isolated DI and 8-ch Relay Output Module

16-ch Isolated Digital I/O Module

3-ch Counter/Timer with 24-ch TTL DI/O Module



PCM-3725



PCM-3730



PCM-3780

## Features

- LED indicators to show activated relays
- Interrupt handling capability

## Specifications

### Isolated Digital Input

- Channels** Opto-Isolated 8 DI channels
- Over-Voltage Protection** 70 V<sub>DC</sub>
- Isolation Voltage** 2500 V<sub>DC</sub>
- Isolator Response Time** 25  $\mu$ s

### Relay Output

- Channels** 8-ch SPDT (Form C) relays
- Nominal Switch** 1.5 A @ 30 V<sub>DC</sub>

### Capacity

- Switching Power** 45 W max.
- Switching Voltage** 220 V<sub>DC</sub> max.
- Switching Current** 1.5 A max.
- Breakdown Voltage** 2000 V<sub>RMS</sub> for 1 min.

### General

- Power Consumption** 100 mA @ +5 V (typical); 280 mA @ +5 V (max)
- Isolated DI Connector** 20-pin post header
- Relay Output Connector** 50-pin post header

## Ordering Information

- PCM-3725** 8-ch Isolated Digital Input and 8-ch Relay Output Module, user's manual and driver CD-ROM. (cable not included)
- PCL-10120-1** 20-pin Flat Cable 1m
- PCL-10120-2** 20-pin Flat Cable 2m
- PCL-10150-1.2** 50-pin Flat Cable 1.2m
- ADAM-3920** 20-pin Flat Cable Wiring Terminal for DIN-Rail
- ADAM-3950** 50-pin Flat Cable Wiring Terminal for DIN-Rail
- PCLD-780** Screw-Terminal Board for 20-pin Flat Cable

## Features

- High output driving capacity and high-voltage isolation
- Interrupt capability
- High sink current on isolated output channels

## Specifications

- Power Consumption** 330 mA @ +5 V (typical); 500 mA @ +5 V (max)

### Isolated Digital I/O

- Channels** Opto-Isolated 8DI and 8DO
- Input Resistance** 2 k $\Omega$  @ 0.5 W
- Output Voltage** Open collector 5 to 40 V<sub>DC</sub>
- Output Sink Current** 200 mA max.
- Isolation Voltage** 2,500 V<sub>DC</sub>
- Throughput** 10 kHz max.

### TTL-level Digital I/O

- Channels** TTL-level 16DI and 16DO
- Input Voltage** Low: 0.8 V max.  
High: 2.0 V min.
- Output Voltage** Low: Sink 8 mA @ 0.5 V max.  
High: Source -0.4 mA @ 2.4 V min.
- Input Load** Low: 0.4 mA @ 0.5 V max.  
High: 0.05 mA @ 2.7 V max.

- Throughput** 30 kHz typical

## Ordering Information

- PCM-3730** 16-ch isolated digital I/O module, user's manual and driver CD-ROM. (cable included)
- PCL-10120-1** 20-pin flat cable, 1m
- PCL-10120-2** 20-pin flat cable, 2m
- ADAM-3920** 20-pin flat cable wiring terminal for DIN-Rail mt.
- PCLD-780** Screw-terminal board for 20-pin flat cable
- PCLD-785/885** 16-ch relay/power relay output board

## Specifications

### Programmable counter

- 3 independent 16-bit counters
- 4 independent programmable clock sources (10 M, 1 M, 100 K, 10 K)
- 12 programmable counter modes
- TTL compatible logical level
- Maximum frequency 20 MHz

### Digital input/output

- 24 TTL input/output channels (8255 mode 0)**  
Input: Logic 0: 0.8V max.  
Logic 1: 2.4V min.  
Output TTL output channels:  
Logic 0: 0.5 V max. @ 24 mA (sink)  
Logic 1: 2.4 V min. @ 15 mA (source)

### Counter/Timer

- Channels** 3
- Resolution** 16-bit
- Compatibility** TTL level
- Max. Input Frequency** 20 MHz

### General

- I/O Connector Type** One 50 pin and one 20 pin box header
- Dimensions** 175 x 99 mm (6.9" x 3.9")
- Power Consumption** Typical: +5 V @ ? mA  
Max.: +5 V @ ? A
- Temperature** Operating: 0 ~ 60° C (32 ~ 158° F)  
(refer to IEC 68-2-1, 2)  
Storage: -20 ~ 70° C (-4 ~ 158° F)
- Relative Humidity** Operating: 5 ~ 85%RH non-condensing (refer to IEC 68-1,-2,-3)  
Storage: 5 ~ 95%RH non-condensing (refer to IEC 68-1,-2,-3)

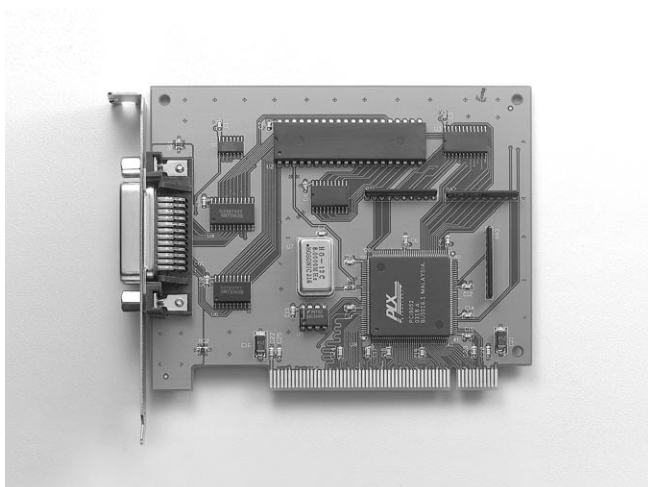
## Ordering Information

- PCM-3780** 3-ch Counter/Timer with 24ch TTL DIO Module
- PCL-10120-1** 20-pin Flat Cable 1m
- PCL-10150-1.2** 50-pin Flat Cable 1.2m
- ADAM-3920/50** 20/50-pin Flat Cable Wiring Terminal for DIN-Rail



# PCI-1670

## GPIB Interface PCI-bus Card



FCC CE

### Features

- Complete IEEE 488.2 compatibility
- Supports Windows® 95/98/NT/ME/2000/XP and DOS.
- Full driver, library, and example support, including Visual C++®, C++ Builder®, LabWindows/CVI, Visual Basic®, Delphi® and LabView® drivers.
- Provides NI-like driver & function libraries.
- PCI bus specification 2.1 compliant
- I/O address automatically assigned by PCI Plug & Play
- Provides powerful and easy-to-use configuration utility

### Introduction

PCI-1670 is a high-performance PCI-bus card with a GPIB interface. The card is fully compatible with IEEE 488.1 and 488.2 standards with its PCI 2.1 bus specification. With two driver control modes: controller mode and slave mode; PCI-1670 can perform basic the IEEE 488 talker, listener and controller functions required by IEEE 488.2. You can also connect up to 15 GPIB instruments. Therefore, PCI-1670 is especially suitable for instrument measurements and control.

PCI-1670 is available for Windows® 95/98/NT/ME/2000/XP and DOS, and it supports complete drivers and libraries. To make driver development easier, PCI-1670 comes with example drivers programmed in: Visual C++®, C++ Builder®, Labwindows/CVI®, Visual Basic®, Delphi® and LabVIEW®.

Furthermore, PCI-1670 also offers powerful testing features and a configuration utility that allows users to easily access and control instruments.

PCI-1670 offers a comprehensive supplementary controller driver database and provides NI-like commands to help users develop applications. Users can use an interactive GPIB window interface to control devices directly without any need of programming.

### Specifications

- **Bus interface** PCI specification 2.1 compliant
- **IRQ and I/O memory automatically assigned by PCI plug-and-play**
- **IEEE 488, IEEE 488.1 and IEEE 488.2 standard compatible**
- **A maximum of 15 GPIB-instruments can be connected.**
- **Connector** IEEE 488 standard 24-pin
- **Speed** GPIB-bus transfer rate up to 1M bytes/sec
- **OS** Windows® 95/98/NT/2000/XP, DOS
- **Libraries** Visual C++, Borland C++ Builder, LabWindows/CVI, Visual Basic, Delphi, Labview
- **Dimensions** 131 x 106 mm (5.15" x 4.17")
- **Operating Temperature** 0 ~ 55° C
- **Operating Humidity** 10 ~ 90% Relative Humidity, non-condensing.

### Ordering Information

- **PCI-1670** GPIB Interface PCI-bus Card, IEEE-488 Cable, 2M
- **PCL-10488-1** IEEE-488 Cable, 1M
- **PCL-10488-2** IEEE-488 Cable, 2M
- **PCL-10488-4** IEEE-488 Cable, 4M

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

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DA&C

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cPCI

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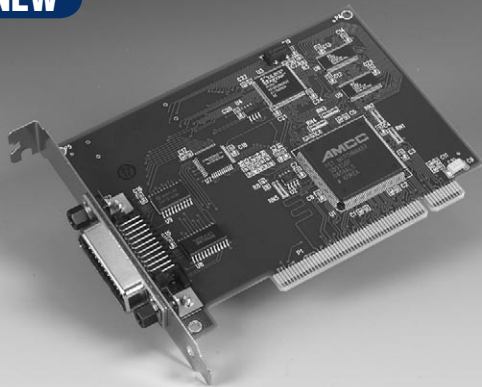
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BAS

# PCI-1671

## High-Performance IEEE-488.2 Interface for PCI-Bus Computers

**NEW**



CE

### Features

- IEEE 488.2 Standard interface
- Complete Talker/Listener/Controller
- Industry standard 32-bit PCI bus
- Data transfer rates over 1 Megabytes/sec
- REP-INSW block transfer
- 1024-word FIFO buffer
- High-Speed State Machine Bus Manager
- 7 Interrupt lines, shared interrupt capability
- Transparent interrupt enabling/disabling
- Includes GPIB-Library software

### Introduction

The PCI-1671 IEEE-488 interface converts any PCI bus personal computer into an instrumentation control and data acquisition system. Connect up to 14 instruments using standard IEEE-488 cables such as the PCL-10488-2, 2 meter IEEE-488 interface cable.

#### Greater than 1MB/s Transfer Rates

The PCI-GPIB transfers data over the GPIB at rates in excess of 1 million bytes per second using the maximum IEEE-488 specification cable length (2 meters times the # of devices). A 1024-word FIFO buffer and the advanced REP-INSW ISR data transfer method provide the horsepower required to then transfer the data between the GPIB board and the host computer. The high-speed state machine also provides byte-to-word packing and unpacking, and because words carry twice the information that bytes do, packed data requires fewer bus cycles to transfer the same GPIB information.

#### IEEE-488.2 (GPIB) Compatibility

The PCI-GPIB adheres to ANSI/IEEE Standard 488-1978. Often referred to as the IEEE-488.2 bus, GPIB bus or HP-IB bus, the GPIB (General Purpose Interface Bus) is a standard for instrumentation communication and control for instruments from manufacturers the world over. The GPIB provides handshaking and interface communications over an 8-bit data bus employing 5 control and 3 handshake signals. Equipped with a PCI-1671, a personal computer can:

Control GPIB instruments, gather data from GPIB test equipment, or become a data acquisition station in a GPIB system.

#### Software

The PCI-1671 includes powerful GPIB-Library. The library greatly simplifies your programming effort. The PCI-1671 is also supported by a wide variety of application software packages including SoftWIRE®, LabVIEW® and many others.

#### Windows® 95/98/2000/XP and DOS Compatibility

The PCI-GPIB hardware supports all popular operating systems and languages regardless of the operating systems support for Plug & Play. The installation software will manage resources for you on systems without Plug & Play.

### Specifications

- **IEEE Compatibility** IEEE-488.1 and IEEE-488.2
- **Maximum Transfer Rate** >1 Mbyte/s
- **Power** 5 V<sub>DC</sub> @ 375 mA Typical
- **I/O Connector** IEEE-488 Standard 24 pin
- **Operating Temperature and Humidity** 0 ~ 60° C @ 0-90% RH
- **Storage Temperature & Humidity** -40 ~ 100° C @ 5-90% RH

### Ordering Information

- **PCI-1671** High-Performance IEEE-488.2 Interface for PCI-Bus Computers
- **PCL-10488-1** IEEE-488 Cable, 1M
- **PCL-10488-2** IEEE-488 Cable, 2M
- **PCL-10488-4** IEEE-488 Cable, 4M

# USB-4711

100 kS/s, 12-bit USB Multifunction Module

**NEW**



## Features

- Supports USB 2.0
- Portable
- No need for external power
- 16 analog input channels
- 12-bit resolution AI
- Sampling rate up to 100 kS/s
- 8DI/8DO, 2 AO and 1 16-bit counter (USB-4711L w/o AO)
- Wiring terminal on Modules

## Introduction

The USB-4700 series consists of true Plug & Play data acquisition modules. No more opening up your computer chassis to install boards. Just plug in the module, then get the data. It's easy and efficient.

USB-4711 offers 16SE / 8DI inputs with 12-bit resolution, up to 100 kS/s throughput, 16 digital I/O lines and 1 user counter/timers, and optional 12-bit analog outputs.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, USB-4711 is perfect for adding measurement and control capability to any computer with a USB port. USB-4711 is fully USB Plug & Play compatible and easy to use. It obtains all required power from the USB port, so no external power supply is required.

## Specifications

### Analog Input

- **Channels** 16 Single-Ended
- **Resolution** 12-bit
- **FIFO Size** 1K samples
- **Sampling Rate** 100 kS/s max.
- **Conversion Time** 10  $\mu$ s
- **Input Range**  $\pm 10 \text{ V} \pm 5 \text{ V} \pm 2.5 \text{ V} \pm 1.25 \text{ V} \pm 0.625 \text{ V}$
- **Input Protection** 30 Vp-p
- **Input Impedance** 2  $\Omega$ /5 pF
- **Trigger Mode Software** On-board or external programmable pacer

### Digital Input / Output

- **Input Channels** 8
- **Input Voltage** Low 0.8 V max.  
High 2.0 V max.
- **Output Channels** 8
- **Output Voltage** Low 0.8 V max.@ 0.8 mA (sink)  
High 2.0 V min.@ -0.4 mA (source)

### Analog Output

- **Channels** 2
- **Resolution** 12-bit
- **Throughput** 100 kS/s

## Ordering Information

- **USB-4711** 100 kS/s, 12-bit USB multifunction module

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

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DA&C

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ADAM-8000

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# USB-4716

100 kS/s, 16-bit USB Multifunction Module

**NEW**



## Features

- Supports USB 2.0
- Portable
- No need for the external power
- 16 analog input channels
- 16-bit resolution AI
- Sampling rate up to 100 kS/s
- 16 DIO, 2 AO and 1 32-bit counter (USB-4716L w/o AO)
- Wiring terminal on Modules

## Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards—just plug in the module, then get the data. It's easy and efficient. USB4716 offers 16SE inputs with 16-bit resolution, up to 100 kS/s throughput, 16 digital I/O lines and 2 user counter/timers, and optional 12-bit analog outputs.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4716 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4716 is fully USB Plug & Play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

## Specifications

### Analog Input

- **Channels** 16 Single-Ended
- **Resolution** 16-Bit
- **Max. SPS** 100 kS/s
- **Conversion Time** 10  $\mu$ s
- **Input Range/Gain** /Bi-polar By Gain Gain = 1, 2, 4, 8
- **Max Input Overvoltage** +/- 15V
- **Trigger Mode** Software / Internal Or External Pacer
- **DC/INL/DNL/..** +/-1LSB / Gain Error
- **AC/SNR/ENOB** 68dB / 11-Bit

### Analog Output

- **Channels** 2
- **Resolution** 16-Bit
- **Ranges** 0 ~ 5V, 0 ~ 10V
- **Accuracy** DNL/INL = +/-1LSB

### Digital Input / Output

- **Input Channels** 6
- **Input Voltage** Low 0.8 V max.  
High 2.0 V max.
- **Output Channels** 16
- **Output Voltage** Low 0.8 V max. @ 0.8 mA (sink)  
High 2.0 V min. @ -0.4 mA (source)

### Programmable Counter / Timer

- **Channels** 1
- **Resolution** 16-bit
- **Compatibility** TTL Level
- **Base Clock** 10 MHz
- **Max. Input Frequency** 10 MHz

## Ordering Information

- **USB-4716** 100 kS/s, 16-bit USB multifunction module

# USB-4718

## 8-channel Thermocouple Input Module

**NEW**



### Features

- Supports USB 2.0
- Portable
- No need for the external power
- 8 thermocouple input channels
- 3000 V<sub>DC</sub> isolation
- Supports 4~20mA
- Wiring terminal on Modules

### Introduction

The USB-4700 series consists of true Plug & Play data acquisition devices. No more opening up your computer chassis to install boards-just plug in the module, then get the data. It's easy and efficient. USB4718 offers 8 thermocouple inputs with 16-bit resolution, up to 0.1% input range accuracy, or 4~20mA inputs.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4718 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4718 is fully USB plug and play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

### Specifications

#### Analog Input

- **Effective Resolution** 16-bit
- **Channels** 8 differential
- **Ch. Independent Conf.** Yes
- **Input Type** T/C & 4~20 mA
- **T/C Type and Temperature Ranges**
  - J 0 ~ 760° C
  - R 500 ~ 1750° C
  - K 0 ~ 1370° C
  - S 500 ~ 1750° C
  - T -100 ~ 400° C
  - B 500 ~ 1800° C
  - E 0 ~ 1000° C
- **Isolation Voltage** 3000 V<sub>DC</sub>
- **Fault and Over-voltage Protection** Resists over-voltage up to 35 V
- **Sampling Rate** 10 samples/sec
- **Accuracy** 0.1% for voltage input
- **CMR @ 50/60 Hz** 92 dB min

### Ordering Information

- **USB-4718** 8-channel Thermocouple Input Module

1  
Software

2  
IPPC

3  
TPC

4  
FPM

5  
ATM & AWS

6  
DA&C

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cPCI

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ADAM-3000

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# ISA-Compatible PCI Cards

## Advantech ISA-Compatible Series

To support current ISA I/O card users and help the migration to PCI, Advantech has released several PCI I/O cards that are compatible with existing ISA cards. The new PCI cards are compatible with the ISA cards' functions, connectors, and software APIs.

With functionally compatible PCI cards, ISA users can upgrade design-ready objects from their ISA platform to the PCI platform, and enjoy the improved performance of a new computer. With connector compatibility, ISA users can keep using all accessories, including the connected wiring boards and circuits. Lastly, the ISA-compatible cards use the same software API as the ISA cards, so there is no need to re-write the program when upgrading the system.

The ISA-compatible PCI cards are designed to assist users who would like to transfer their current application to a new platform in the shortest time possible. This not only saves time and money, but also raises the efficiency of the design. Following is a list of ISA-compatible products.

PCI	ISA	Product Features	Page
Multifunction Cards			
PCI-1718H DU	PCL-818HD	12-bit 16-ch Multifunction	6-18
PCI-1718H GU	PCL-818HG	12-bit 16-ch High-Gain Card	6-18
Analog Output			
PCI-1727U	PCL-727	12-ch Analog Output Card	6-30
Isolated Digital IO Cards			
PCI-1730	PCL-730	16/16 Isolated Digital IO Card	6-34
PCI-1733	PCL-733	32-ch Isolated Digital Input Card	6-34
PCI-1734	PCL-734	32-ch Isolated Digital Output Card	6-34
Relay Cards			
PCI-1761	PCL-725	8-Relay, 8 Isolated DI Card	6-44